ELECTRICAL REVIEW

ILLUSTRATED.

A WEEKLY JOURNAL OF

Electric Light, Power, Telephone, Telegraph and Scientific Progress.

VOL. 21. No. 26. WEEKLY. | NEW YORK, SATURDAY, FEBRUARY 18, 1893. | $3 per Annum. Single Copies, 10 Cents

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Entered at Post Office, New York, as Mail Matter of the Second Class.

VIEWS, NEWS AND INTERVIEWS.

Traffic on the cars of the West End Street Railway of Boston has increased to such an extent that, it is reported, the company is considering the advisability of petitioning the Massachusetts Legislature for permission to tunnel Boston Common.

The Board of Public Works, of Milwaukee, will have an ordinance introduced in the City Council requiring every telephone, telegraph and electric light company to furnish a map of its wires in the city. A penalty of $10 to $100 fine for non-compliance will accompany the ordinance.

The manufacture of aluminum by an electrolytic process is to be gone into quite extensively at Forges, France. The falls of the Praz river giving 2,000 horse-power, are to be utilized and a plant is to be erected soon.

The Berlin Electrical Society have lately been experimenting with a portable electric light designed to aid in the search for wounded soldiers at night. A 50-candle-power lamp is employed, operated by a storage battery which is said to weigh but 17½ pounds.

At a recent meeting of the Paris Academy of Sciences there was described a new method of preparing the metal chromium by the aid of electricity. An aqueous solution of chrome alum is made, to which is added an alkaline sulphate; the solution is made acid by the addition of a little sulphuric acid and a decomposing current is then sent through the solution. Pure chromium it is declared is then deposited at the negative pole. When thus prepared the metal is of a bluish-white color and is very hard. It resists atmospheric influences and is not attacked by concentrated sulphuric acid, nitric acid, or by a concentrated solution of caustic potash. It is proposed to carry chrome plating on an industrial scale, to replace the nickel plating. It is said that good adherent deposits of chromium have been obtained from the same bath on brass, gun metal, copper, and even on iron. An ingot of the pure metal, weighing one pound has been prepared and sent to the academy by the inventor of the process, who is now engaged in investigating various alloys of the metal.

A novel storage-battery electric street car, for which is claimed a high efficiency at a moderate expense, has just been built at San Francisco. The car is 34 feet long and decorated in cream and gold. It is built after the style of the Pullman vestibule cars, with Pullman windows and curtains, fittings of oxidized bronze, and upholsteries in plush. The interior wood finish is of bird's-eye maple; 16 electric lamps will light it, and a push button to signal to the motorman to stop the car will be beside each passenger. The car is provided both with air and hand brakes; a 20 horse-power motor, run by the storage batteries, develops a high speed enough to send the car up steep grades at a rapid rate.

The Westinghouse Electric and Manufacturing Company have paid into the Pennsylvania State treasury $50,000, as the outcome of recent tax suits with the Commonwealth.

It has been declared by the New York Board of Electrical Control that all poles must be taken down in what they have called the prescribed district, No. 4, which is bounded by the Battery and Fifty-ninth street, Eighth avenue, Greenwich street, West street and Eleventh avenue. It was decided to give the companies 90 days' notice.

Counsel for the Westinghouse Electric Company have obtained an order in the United States Circuit Court, in Pittsburgh, directing the Edison General Electric Company to show cause why the injunction which has been granted against the Westinghouse Company, restraining it from manufacturing the all glass globe lamp, should not be construed or re-stated, if need be, as in terms to exclude the new stopper lamp of the Westinghouse Company, and thus prevent any further statement on the part of the Edison Company that such new lamp is an infringement of the Edison lamp patent.

Educate Children in Electricity.

A young lady of Philadelphia declares that recently several exhibits in Boston, illustrative of the trolley, were made by kindergarten pupils, and she hopes that the attention of the little ones of Philadelphia will also be turned toward rapid transit. There is more in this remark than would at first appear. Without doubt, the best time to effect radical or considerable changes in the character and habits of a nation is when its people are in the formative stage, when their impressions have not become deep rooted. By all means let us plant the seeds of rapid transit, by electricity, in the minds of the kindergarten pupils, and when they grow up they will become thorough converts.

But, perhaps this method is too slow. When the children of this age have become men and women, the rapid strides that electric traction is taking will far out-distance all prejudices, and there will practically be no objection at all. Those who are not in favor of the electrics will be left far in the rear, for improved construction will overcome all dislikes, either real or imaginary.

FIG. 1.—BOSTON AND CHICAGO UNITED—INTERESTING SCENE IN THE BOSTON TELEPHONE OFFICE—GOVERNOR RUSSELL SEATED AT THE INSTRUMENT AND LIEUTENANT-GOVERNOR ROGER WALCOTT AND ADJUTANT-GENERAL DALTON IMMEDIATELY BACK OF HIM.

BOSTON AND CHICAGO UNITED.

OFFICIAL OPENING OF THE LONG DISTANCE TELEPHONE LINE CONNECTING BOSTON AND CHICAGO—GOVERNOR RUSSELL, OF MASSACHUSETTS, AND STAFF AT THE TELEPHONE — DESCRIPTION AND ILLUSTRATION OF THIS IMPORTANT EVENT—DE WOLF HOPPER AT THE CHICAGO END.

Following closely on the most important event in the history of the telephone, the binding together of the two great cities of New York and Chicago, was the welding of another link in the metal chain, by which Boston was included in the sisterhood.

The ceremony was conducted most successfully and under highly favorable auspices at the headquarters of the American Telephone and Telegraph Company on Milk street in Boston on the afternoon of Tuesday, February 7. Invitations was issued to about 200 guests, and the gathering represented the leading citizens of the city and the State.

The spacious apartment on the ground floor, which was the scene of the interesting event, as shown in our illustration, was handsomely fitted up for the occasion, the chandeliers being decorated with evergreens and ferns, and the windows and mantels banked with palms and flowers. In the center was the chief object of interest, the long distance instrument through which the conversations were held, and immediately in the rear of this was a table holding 40 receivers, by means of which the guests were enabled to hear what was being said at both ends of the line. A little to the left was located a temporary "central office," consisting of a desk fitted with a miniature switchboard by means of which the connections were made. One end of the room was filled by a number of handsome sound proof booths lighted within by incandescent lamps, and with their elaborate decorations and orange silk draperies, presenting a very tasteful appearance.

Guests began to arrive shortly before 4 o'clock, and at 4.30, when the Governor and his staff were announced, the room was crowded.

President John E. Hudson opened the ceremonies with a few appropriate remarks, and then presented Governor Russell, whom he escorted to the seat of honor at the instrument.

Before opening conversation a flash light photograph was taken of the scene, and then, while those fortunate enough to secure one of the receivers listened attentively, the Governor proceeded to exchange a few words with Mr. Wendell Baker, at Chicago. After extending the compliments of the State he touched lightly on the commercial importance of the event, and the advantages of closer relations between the two cities.

As the Governor left the instrument the room was filled with the music of a cornet, to which the majority of those present listened in some astonishment, wondering from whence it came.

Investigation developed the fact that a receiver, fitted with a horn-like mouth piece had been concealed among the draperies of one of the chandeliers, and through this the

music rendered in Chicago was distinctly audible in all parts of the room.

This feature was loudly applauded, and was repeated at intervals between the conversations during the rest of the afternoon. After each of those present had tested the efficiency of the service, they were escorted through the operating room and afforded an opportunity to see the "hello" girl in the midst of her work. The next step was to the banquet room, and here, as elsewhere, the company did themselves proud.

The immense table was loaded with good things, and together with the flowers, the lights, glittering silver and excellent music, formed a most fitting wind up to an enjoyable afternoon.

The line, of which this was the formal opening, extends from Boston, by the most direct route across Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio and Indiana, to the city of Chicago. The principal points touched by the main line are Providence, New York, Newark, Harrisburg, Pittsburgh, Cleveland, Toledo and South Bend, Indiana.

In the eastern States, connecting lines run to all important points, from Portland, Me., on the east, to Buffalo on the North and Washington on the south. In the west, branches are completed from Chicago to Milwaukee and from Toledo to Detroit. Through these branches and connecting lines communication will soon be had with the principal cities in Ohio, Indiana, Illinois, Michigan and Wisconsin.

The main line from Boston to Chicago is a little over 1,200 miles in length. In the construction of this 54,000 cedar and chestnut poles are used, averaging about 35 feet feet in height. A metallic circuit, consisting of two No. 8 hard drawn copper wires is used, weighing 435 pounds to the mile, the total circuit containing 1,044,000 pounds of copper.

These figures will give some idea of the magnitude of the undertaking, and the enterprise which prompted and successfully carried out one of the most gigantic operations of the nineteenth century.

Mr. Stephen L. Coles, at the Chicago end and Mr. H. G. Tuckerman, at Boston, exchanged greetings as members of the REVIEW staff present on this interesting occasion.

AT CHICAGO.

The opening ceremonies at the Chicago end of the line were of an informal character and were witnessed by about 50 people. The ELECTRICAL REVIEW was the only electrical paper which had a representation at the Chicago end and, with representatives in Boston, is able to furnish a complete report of the opening. Among those present in Chicago were Mayor Hempstead Washburne, Major Moses P. Handy, chief of the World's Fair Department of Publicity, Charles Henrotin, ex-president of the Chicago Stock Exchange; Washington Becker, of Milwaukee; Budd Doble, the famous horseman; Lieut. E. J. Spencer, in charge of the General Electric Company's work at the World's Fair; Dr. Meany, of Chicago; De Wolf Hopper, the seven-foot (nearly) comedian; Samuel Reed, of the De Wolf Hopper Opera Company; A. S. Hibbard, general manager of the Chicago Telephone Company; F. G. Beach, general superintendent of the Central Union Telephone company; A. G. Fuller, of the American Bell Telephone Company; Stoughton Walker, Western district superintendent of the American Telephone and Telegraph Company; Mr. Mosely, Wendell Baker, contracting agent for the American Telephone and Telegraph Company; F. A. Baker, Albert P. Allen, in charge of the technical work at the Chicago end of the line, and several daily newspaper men.

The offices of the American Telephone and Telegraph Company, at 105 and 107 Quincy street, are handsomely decorated and furnished and are well adapted for such an affair. The arrangement and fittings of these offices are due to Mr. A. S. Hibbard, who designed them while he was superintendent of the American Telephone and Telegraph Company.

The actual opening occured at 3.26 P. M., Chicago time, February 7, 1893, when Cornetist Nielson took his position at a funnel-shaped transmitter and played "Hail to the Chief." At 3.32 Wendell Baker, the great Harvard runner, began talking with Governor Russell, of Massachusetts, and reminded him that he was conversing over about 2,500 miles of No. 8 copper wire—Chicago to Boston and return — forming the longest telephone circuit in the world. The man with the cornet then entertained the Boston listeners at 3.29 with the "Star Spangled Banner;" 3.45, "Maggie Murphy's Home; 3.51, "Annie Laurie;" 3.53, "Red, White and Blue;" 3.55, "Ta-ra-ra Boom-de-ay;" 4.02, "Bugle Call;" 4.08, "Yankee Doodle;" and at 4.15 again played "Hail to the Chief," as De Wolf Hopper came in smiling, with Sam Reed.

Lieut. Spencer then talked over the line and after him came Mr. Henrotin, who discussed stocks and bonds with the president of the Boston Stock Exchange and did a little booming for the World's Fair. Then the ELECTRICAL REVIEW correspondents greeted each other over the wire, and at 4.40 De Wolf Hopper assured Assistant General Manager Meany, in Boston, that he never saw him looking better. "I feel like a dream," said Mr. Hopper, in answer to a question from Mr. Meany, and then proceeded to work off some of his "Siamese gags." At 4.50 Mr. Hibbard and Mr. Meany congratulated each other on the successful working of the line. A representative of the Chicago *Herald* talked with a Boston *Herald* man at 4.52, and then Mr. Stoughton Walker exchanged news with his father, Gen. Francis A. Walker, president of the Massachusetts Institute of Technology. The cornet was again called upon, and following this De Wolf Hopper sang a burlesque ballad, and rendered as an *encore* his world-famous "Birdie" song with great gusto. Mr. Hopper is thus the first person who ever sang a song over the longest telephone line in the world, and who has caused an audience 1,250 miles away to appreciate and laugh at a jest. A few other people then tested the line and the achievement of another great telephonic undertaking was successfully accomplished.

FIG. 2.—BOSTON AND CHICAGO UNITED—VIEW OF THE CHICAGO OFFICE OF THE LONG DISTANCE TELEPHONE COMPANY, ON QUINCY STREET.

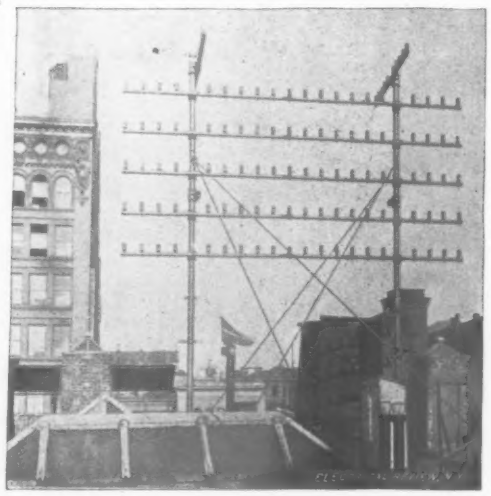


FIG. 3.—MODERN ROOF STRUCTURE FOR TELEPHONE WIRES.

TELEPHONE LECTURES AT COLUMBIA COLLEGE.

Mr. J. J. Carty, electrician of the Metropolitan Telephone and Telegraph Company of this city, and Mr. F. A. Pickernell, electrician of the American Telephone and Telegraph Company, gave very interesting talks on the telephone at Columbia College last week, under the auspices of the New York Electrical Society; Mr. Joseph Wetzler, president, and Mr. Geo. H. Guy, secretary. There was a large attendance and a special outfit of a score or more telephones were fitted up, and all who desired were privileged to talk to Chicago without charge.

We present two "snap-shot" views of Messrs. Carty and Pickernell, taken by a REVIEW photographer, and our direct reproductions of the photographs give excellent likenesses of these two brainy young electricians. A view of the very interesting laboratory of Mr. Pickernell is also shown, as well as two views giving the old and new way of constructing roof fixtures for wires. There has been great progress made in all branches of this work, and the important detail of such fixtures has not been neglected by the progressive management of the American Telephone and Telegraph Company.

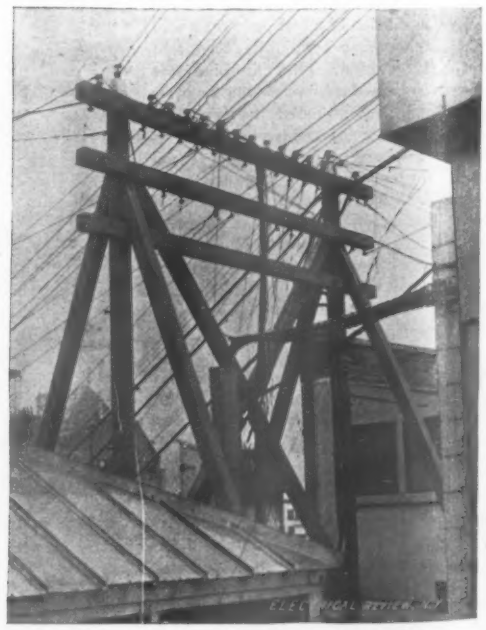


FIG. 4.—OLD AND CLUMSY ROOF STRUCTURE.

New Jersey Joins the Ranks in the March of Progress.

ONE HUNDRED AND FORTY MILES OF TROLLEY LINES TO BE CONSTRUCTED.

Surprises, agreeable surprises, are in order. One of the largest transactions in street railroads that has yet taken place in this country has just been consummated by a number of New York and Philadelphia capitalists who are represented in the deal by the well known New York contractor, John D. Crimmins.

The need has been felt for a long while for more rapid transit between the scattered though well populated towns and cities of New Jersey, and now this syndicate with its millions of capital to back it has arranged with the numerous street car and ferry companies whereby this extensive system will enable residents of Newark, Elizabeth, Bloomfield, Montclair, Orange, etc., to have rapid transit by trolley lines between all of the ferries and between the cities themselves. The negotiations have all been closed, but the names of the capitalists have been withheld. It is not the idea of the company to enter into any sort of a rate war with the steam railroads, but they do intend to give the residents of New Jersey railway accommodations such as they never had before. Residents along the proposed line are enthusiastic over the scheme, and they are doing all in their power to further the speedyconsummation of the work. Twenty feet right-of-way in graded and macadamized roads have been offered to the syndicate.

The controlling interest of many of the principal street car lines has passed into their hands and as much as $315 per share of $100 par value has been paid to the Pennsylvania Railroad Company for the majority of the stock of one company.

Let the good work continue. The cry "still another line to adopt electric traction" will, we hope, continue until every street railway in this most progressive country in the world shall be thoroughly equipped with the latest electric rapid transit facilities.

ELECTRIC LIGHT FLASHES.

Elkins, Md., is to have an electric light plant.

Pitkin, Colo., is figuring on an electric light and water plant.

The property of the Dubuque Electric Light and Power Company will be sold on March 1.

Repairs and improvements at the Electric Light and Carborundum Works in Monongahela, Pa., are being pushed rapidly forward.

The Dousman Milling Company, at De Pere, Wis., is putting in an electric light plant that will illuminate the city as well as their own establishment.

Lansing, Mich., now owns her electric light plant, and the council has decided to reduce the price of incandescent lighting 10 per cent., and to run all night.

A new 1,300 incandescent light dynamo has just been placed in the electric light station in Lansing, Mich. The works now have a capacity of 3,000 incandescent lights.

The cost of arc lighting in Canada is, as it is here, a variable quantity. Montreal at present pays $124.10 a year for each arc lamp; Toronto pays $108.59 per light; Kingston, $81; Ottawa, $80; Quebec, $80.

One of the large boilers for the electric light works in Geneva, N. Y., has been placed in position. It is from the N. Y. C. Iron Works Company. Others from the same shops will replace the old ones as rapidly as possible.

One of the largest buildings in Toledo, O., is the new electric light power house on Water street. It will be completed this week, and will have a capacity for twice the amount of machinery used in the other power house on St. Clair Street.

The new electric light plant of the Titusville Electric Light Company, at Titusville, is a very complete one, and attracts considerable attention. The engines are two 150 horse-power Ball tandem compounds, furnished by the Ball Engine Company, of Erie, Pa.

The Board of Education of St. Paul, Minn., have let the contract to the Edison Electric Light Company for lighting and heating the high school buildings in the city on the following terms: $4,600 for the first year, $4,000 for the second, and $3,500 per year thereafter.

A special meeting of the city council of Menasha, Wis., was held to discuss the electric light question. Upon learning that the city would be liable to prosecution for selling incandescent lights to private parties, the project of the city owning its own electric light plant was abandoned.

It is rumored that an arrangement has been made between the Capital City Gas Light Company and the Water Power Electric Company in Des Moines, Ia., whereby the eastern corporation secures ownership and control of the plant of the local electric light company for $100,000.

A 60-foot traveling crane is being placed in position in the foundry of the new factory buildings of the Thomson-Houston Electric Company, now being erected near the Saugus River in Lynn, to be operated by electricity. It is expected that 2,500 men will find employment in the river works.

Each armature of the monster dynamos built for the World's Fair by the Westinghouse Company weighs about 21 tons and its diameter is seven and a half feet. The total weight of these 13 dynamos will be 900 tons, having a maximum capacity of 180,000 lights and requiring engines with an aggregate of about 12,000 horse-power to run them.

The suit of the Findlay Electric Light and Power Company, of Findlay, O., against the Hancock Electric Light and Power Company, regarding the right of having a monopoly of the lighting in that town, has been decided by Judge Morris, of Marion, in favor of the Hancock Company on all points, dismissing the petition at the plaintiff's cost. Notice of an appeal has been given.

$50,000 Involved in an Electric Lighting Suit.

The Palace Hotel, San Francisco, possesses an electric light plant which the manager thinks cost too much. Dr. Allan V. Garratt and C. F. Johnson, have helped the owners of the hotel to reach this conclusion. The San Francisco *Chronicle* of February 4 says:

Some months ago, in the course of Mr. Johnson's researches, his eye lighted upon the electric light plant and he commenced to investigate it. He sent to Spokane for a certain Mr. Garratt, an electrical expert. That gentleman has been here and has gone. He left behind him a mass of figures and documents relating to the electric light plant, and the result of these documents is the intention to sue the Electric Improvement Company for $50,000. The expert went all over the machinery in the separate building. He then scrutinized the wiring, switches, cutouts, etc., in the Palace Hotel, and of all he saw he made careful estimates, with the result that Mr. Johnson believes that the Palace Hotel has paid between $40,000 and $50,000 too much for the plant.

Mr. Johnson is evidently acting under instructions from Mr. Newlands. The inspection by the expert took place some time ago.

The plant on the corner of Mission and New Montgomery streets is a handsome one and occupies the entire basement. There is a powerful engine, stack of boilers and six dynamos, each of 1,200 light capacity, or 7,200 in all. Of these lights the average use by the Palace Hotel is 4,000 lights a night, the full capacity only being used on special occasions.

While there is no question as to the facts as here stated, it must be admitted that there are those who, when spoken to about it, "wink the other eye."

FIG. 5.—DEWOLF HOPPER AT CHICAGO DELIGHTING BOSTON EARS WITH A SONG AND STORY VIA LONG DISTANCE TELEPHONE.—A. S. HIBBARD BACK OF THE INSTRUMENT.

LITERARY.

The publication issued by Burk & McFetridge, of Philadelphia, under the name *Reciprocity*, contains an abundance of information pertaining to domestic and international trade. Owing, however, to the political significance which has been given to the subject of reciprocity, the publishers have deemed it wise to change the name of the paper, and it will hereafter be known as *Traffic*. Daniel E. Hening will remain in editorial charge of the publication under its new name, and it will be conducted, as before, purely as a business newspaper.

The New York and New Jersey Telephone Company have issued an artistically illustrated catalogue from the press of Bartlett & Company, descriptive of the many advantages to be gained from the use of the pay-station.

FIG. 6.—ELECTRICIAN F. A. PICKERNELL, OF THE AMERICAN TELEPHONE & TELEGRAPH COMPANY, AT HIS LABORATORY DESK.

FIG. 7.—ELECTRICIAN J. J. CARTY, OF THE METROPOLITAN TELEPHONE & TELEGRAPH COMPANY.—CAUGHT IN THE ACT OF SOLVING A TELEPHONE PROBLEM.

TELEPHONE NOTES.

The annual report of the telephone company in Brooklyn, filed last week, shows a capital stock amounting to $1,000,000. The debts are $284,397, and the assets amount to $1,144,475.

The annual meeting of the Southern New England Telephone Company stockholders was held in New London, Conn., last week, and elected the old board of directors. Officers will be chosen this week.

The Rocky Mountain Bell Telephone Company have an application before the City Council, asking for a franchise to operate a telephone company in Pocatello, Idaho. The manager declares that as soon as the franchise is granted the company will put in a $20,000 plant.

In Poughkeepsie the new system of telephone calls, changing from names to numbers, is being adopted. The residents of the city are so superstitious that a general refusal has been made to accept No. 13, and it has been omitted from the list. Newburghers are not superstitious, but it may be considered a strange coincidence that L. J. Bazzoni, previous to his failure, was known as No. 13 at the telephone office. The number is no longer held by a Newburgh subscriber.

An action of Col. William H. Eckert, to recover 270 shares of stock from the Metropolitan Telephone and Telegraph Company, was dismissed by Justice Andrews of the Supreme Court last week. The plaintiff, who was general manager of the company from 1882 to 1890, said that in addition to his salary the company agreed to hold 90 shares of stock for him, which he could purchase when convenient at par. He had offered to purchase, but the company refused to sell. The company denied the agreement.

On January 27 a circular letter was sent out to local business men by the Trades' League, of Philadelphia, in which the recipient was asked to state his grievances against the telephone service if he had any. The return mail showed that 97 of them could not find any fault with the present service, and all the others were strong in their denunciation of lack of attention, rates, etc., etc. The local telephone companies declare that, with most subscribers, if there were such a thing as perfection, they would kick at the spelling of the word in lieu of anything better.

The Missouri and Kansas Telephone Company have asked for a franchise in Kansas City, Mo., to put in their conduits for telephone wires. The ordinance provides that the conduits shall be laid in accordance with the directions of the city engineer, and that at least one mile of the conduit system shall be in actual operation within one year after the franchise takes effect. A proposition to pay for the franchise has been made by the company. No definite amount is stated, but the company agrees to make the city such a compensation as shall be agreed upon in conference between officers of the company and a council committee.

A Physician's Electrical Cabinet.

Every progressive physician keeps in touch with electrical progress, and possess facilities for properly using the electric current. A complete office cabinet, manufactured by the Waite & Bartlett Manufacturing Company, of New York, a company that stands at the head in its line, is shown in this issue. The cells are the most perfect of their kind, and have stood the test of time and use, and are always furnished, unless some other form is specially desired by purchaser. The current selector is universal, and any cells, or cell, from the entire series may be used, and thus a great saving of the battery, and uniform wear of same, are obtained. It contains also an automatic rheotome for giving interrupted galvanic currents. The polarity changer is of substantial make, has rubbing contacts and keeps in order. The German silver wire rheostat has coils from 5 ohms to 5,000 ohms resistance each, the entire resistance of all the coils being 17,000 ohms, and by means of this rheostat and the milliampere meter the resistance of the patient's body may be measured or the condition of the cells tested. The water rheostat is used to modify the current gradually. The cabinet also includes the Dubois-Reymond style of Faradic apparatus. The secondary coil can be removed, and coils of various sizes and lengths of wires may be used, and the various qualities of current obtained. It is provided with a slow and rapid rheotome, also with a contact key to be operated by the finger, a great help in diagnosis. The instrument, also, is furnished with a milliampere meter for measuring the current strength. The case contains two small closets with bevel glass doors, two large drawers and a sliding shelf available as a desk. The castors are of large size, and rubber tired, making it easy to roll, noiseless, and capable of being moved on a polished floor without marring the same. The lower part has doors in the back as well as in the front, making the cells accessible, and easy of inspection. The factory of the Waite & Bartlett Company was recently moved to new and larger quarters, No. 222 East Twenty-fourth street. A new department will provide for the needs of experimenters and inventors—a feature that will be much appreciated. Dr. H. S. Waite is preparing the World's Fair exhibit, which will be a very extensive one. The office of the company remains at No. 204 East Twenty-third street.

English Manufacturers at the World's Fair.

I was so fortunate as to secure, what I hope will be interesting to your readers, a list of the electrical firms that will be represented at your great Fair. It is taken from the private list belonging to the Society of Arts, which by special favor I was permitted to copy.

The number of British firms of all trades and descriptions is only 584, and these are divided into 169 groups. With the title of each firm, I give the number of the group to which it is assigned:

Easton & Anderson, 3 Whitehall, London, S. W. (69).

Elmore's American and Canadian Patent Copper Depositing Company, Limited, 64 Cannon street, E. C. (131).

The Epstein Electric Accumulator Company, Limited, 21 Blythe Road, West Kensington, W. (124).

S. Z. Deferranti, Limited, Charterhouse Square, E. C. (127).

Sir John Fowler, Bart., 2 Queen's Square Place, Queen Anne's Mansions, S. W. (80).

Galloway, Limited, Knott Mill Iron Works, Manchester (69).

General Electric Company, Limited, 71 Queen Victoria street, E. C. (129).

R. Hornsby & Sons, Limited, Spitalgate Iron Works, Grantham (69).

Industries, Limited, 358 Strand, London, W. C.) 150).

Local Committee for Ireland at the Chicago Exhibition, 39 Dame street, Dublin (150).

Price's Patent Candle Company, Limited, Belmont Works, Battersea, London, S. W. (18).

Ward Electric Car Company, 75 Victoria street, Westminster, S. W. (83).

Messrs. Goolden & Company, 2 Victoria Mansions, Westminster, S. W., who are doing a large trade in electrical mining machinery, will be represented at the World's Fair on the exhibit stand of the General Electric Company, an American firm, who, in answer to their application by advertisement in the New York ELECTRICAL REVIEW, have taken up an agency for Messrs. Goolden & Company, and will show their specialties at that stand.

JOSEPH FRENCH.

London, February 4, 1893.

Cost of Municipal Electric Lighting.

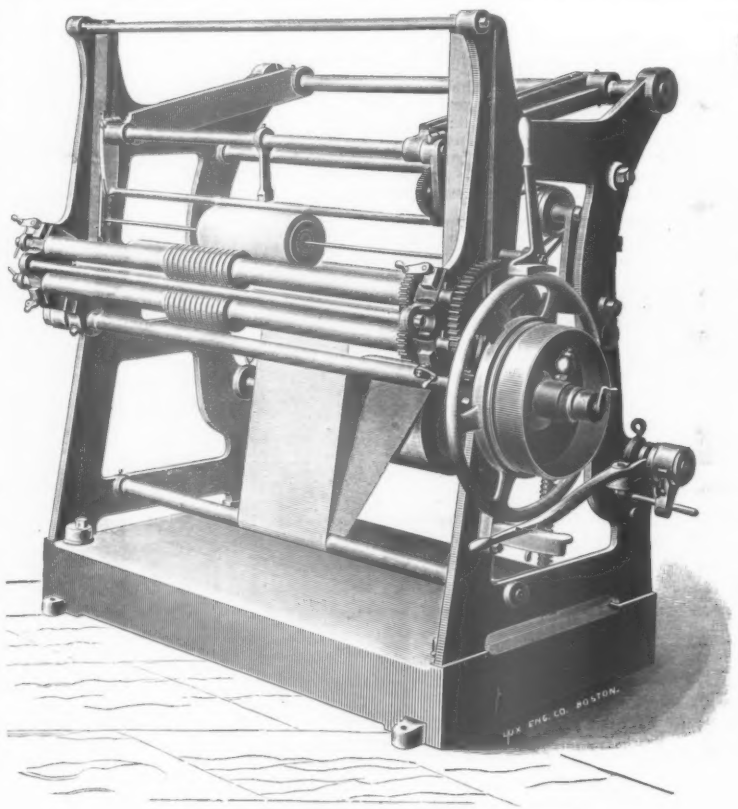
From this table it is seen that the average cost of each arc light owned and directly operated by 25 cities is $53.04 a year. In the case of only three or four of the cities does it appear that interest on the investment has been included. Obviously, account should be taken of both interest and depreciation of property, which items, computed at 12 per

AN ELECTRICAL CABINET FOR PHYSICIANS—THE WAITE & BARTLETT MANUFACTURING COMPANY, NEW YORK.

cent. of the total value of the 23 plants and buildings, would add $33.60 to the first cost, making the average final cost to the 23 cities operating electric lighting plants, $86.64 per arc light per year.

There is one important factor that has not been considered in this cost, namely, the profits which many of the cities receive from light supplied to private and commercial houses. Staunton, Va., for instance, in addition to lighting its streets, derives a revenue from this source almost equal to the cost of operating its plant. Hannibal, Mo., draws an income of $4,000 a year from rented lamps, and Chariton, Ia., it is said, earns $15,000 a year in the same way. Eighty dollars per light per year will be found to be much nearer the real cost of municipal electric lighting in the United States if the receipts from commercial lamps are deducted.

Table II gives the contract prices paid by 29 cities to private electric lighting companies during the same period covered by Table I. It is compiled from a government report on gas and electric lighting, published as "Senate Miscellaneous Document, No. 56, Fifty-first Congress, Second Session," and the aim in its preparation has been to select from the parts of the country in which the 23 municipal works are situated private plants having the same arc light capacity. For instance, Peoria, Ill., with a capacity of 233 arc lights is set over against Bloomington, Ill., with 240 arcs. Twenty-nine cities rather than 23 have been taken, for the reason that in six of the cities most nearly fulfilling the conditions upon which the selections were based, the cost appears to be abnormally high. The average yearly price charged for each of the arc lights by the 29 private companies is shown to be $106.01, or nearly $20 a lamp more than it costs the 23 cities to supply themselves with this service. This price is only $2.79 greater than the average charged by all the private companies, large and small, in the 12 States covered by the tables, and cannot be regarded as due to exceptional conditions. Most of the contract prices given for the private lamps still obtain, and therefore the two tables fairly represent the present relative costs under municipal and private control.—*By R. J. Finley, in February Review of Reviews.*



THE MEISEL SLITTING AND RE-WINDING MACHINE.

Officers of American Association of Inventors.

At the January meeting of this association in Washington, Dr. R. J. Gatling, of Hartford, Conn., was re-elected president; Hon. Gardner G. Hubbard, Washington, D. C., first vice-president; Mr. Thomas Shaw, Philadelphia, second vice-president; Mr. J. C. Anderson, Chicago, Ill., third vice-president; Hon. William E. Simonds, Washington, fourth vice-president; Mr. George C. Maynard, Washington, D. C., secretary and treasurer; with the following board of directors: Marvin C. Stone, Washington; Arthur Steuart, Baltimore; Albert A. Pope, Boston; L. W. Serrell, New York city; John V. Rice, Jr., Edgewater Park, N. J.; Ward Willits, Chicago, Ill.

To Manufacture Material for Wire Insulation.

The rapidly increasing demand for insulated wire has brought out a new machine of great value to manufacturers of electrical supplies, especially in the insulation of wire. We present on this page a cut of the new Meisel slitting and re-winding machine, which is designed for slitting and re-winding in very narrow widths, roll paper, cloth, felt and other materials. The rubber covered tape commonly used in insulating wire is cut on this machine to great advantage.

The characteristic points of advantage in the Meisel slitting machine for roll slitting may be summarized as follows:

The machine is adapted to cut and rewind any kind of paper from the lightest tissue to cardboard; or it will cut equally as well thin cloth, felt or tapes of any kind. The rubber coating for insulating tapes may be applied to the cloth in rolls of full width which can then be slit and rewound into narrower rolls of great firmness, or the cloth can be slit into rolls and the rubber mixture subsequently applied.

To the manufacturers of and dealers in telegraph paper this machine is invaluable. Its speed and accuracy in slitting and re-rolling the paper into smooth, hard rolls is said to place it far in advance of any other method in use, both in economical production and superior quality of work.

Wide rolls of either paper or cloth are received on the machine and cut and re-wound into any narrower widths desired, from three-sixteenths of an inch up to the maximum. The cutting knives, which are of tempered steel, rotate on shafts at a high speed; they are separated on the shaft by spacing rings or collars of different thicknesses as shown in the illustration and are thus very easily adjusted to different widths. The edges of the cutters lap over each other a trifle at the point of contact, cutting on the principle of shears. They are rotated at the same rate of speed as the paper or cloth and cut perfectly clean edges without dust. For this reason, too, the cutters are said to retain their cutting edges longer than on any other slitting machine known.

The surface winding principle is used, winding about 250 feet of paper per minute, at a uniform speed from beginning of winding until the roll has attained its largest diameter. The rolls are rewound on the shaft or core without interlapping, leaving the cut rolls perfectly straight and smooth. The rewinding shaft or core may be any size from three-eighths of an inch diameter upwards; that is, the holes in the rolls to be rewound can be made as small as three-eighths of an inch in diameter or any size larger. The waste of material has been reduced to almost nothing.

The machine is built very strong and of the best materials and workmanship. Especial care has been taken while constructing it so that it can easily be operated by the average mechanic. It is built in a variety of sizes, the standard size taking rolls 40 inches long and 30 inches in diameter.

This machine is the invention of Francis Meisel, of Boston, and is covered by United States patents, already allowed, which will be issued about the first week in March. Notwithstanding the fact that it has been on the market but a comparatively short time, it has already proven its worth, as testified by the parties using it. The Kidder Press Manufacturing Company, Norfolk avenue, Boston, are the builders of these machines. They inform us that they will be pleased to send circulars, testimonials, prices and a sample roll cut on the machine to any of the readers of the REVIEW who may write for them.

The Cleveland Switch.

Mr. W. B. Cleveland, of Cleveland, Ohio, inventor of the widely used electric switch bearing his name, announces, under date of January 27, that he has assigned his entire interest (Patent, No. 391,512), to the Bryant Electric Company, of Bridgeport, Conn. With the assignment also go the tools, patterns, etc., used by the Forest City Electrical Works in manufacturing the switches and arc cut-outs. This will be a valuable addition to the enterprising Bryant Company's manufacture.

Modern Electric Light Stations.

TWO VIEWS OF STATIONS BUILT BY THE BERLIN IRON BRIDGE COMPANY—PAWTUCKET, R. I., AND NORWALK, CONN.

The illustrations of two new electric light stations, presented in this issue, will interest all our readers, particularly those who are engaged in supplying electric light and power. The builders of these stations, the Berlin Iron Bridge Company, of East Berlin, Conn., have rightly won an enviable reputation for model construction in this field, and their very extensive facilities and engineering talent of high order, are now largely devoted to work of this nature.

The illustration in Fig. 1 is taken direct from a photograph and shows a unique roof construction. It shows an iron roof designed and built by the Berlin Company for a dynamo room for the Norwalk and South Norwalk Electric Light Company, at Norwalk, Conn. The roof itself is of the well known Berlin pattern. The building is 60 feet in width and 70 feet in length. It was desired to have a power crane for moving the dynamos in and out of position, but owing to the extreme width of the building, a traveling crane was too expensive, especially in view of the fact that it was only desired to control a limited portion of the floor space. To meet this condition the roof trusses were designed in such a way that the traveling crane girders could be secured to the roof trusses at two points, allowing a crane of about 16 feet span to be used with a travel the full length of the building. This crane controls a floor space of 16 feet of width of the building, and the full length, which was all that was desired, and brought the expense for power to move the dynamos in and out to a very economical point. The traveler has a motion on the crane girder lengthwise the full length of the building, and sidewise the motion is secured by a trolley on the crane, to which an ordinary chain hoist is attached. The capacity of the traveling crane is 4,000 pounds, which is amply sufficient for all ordinary purposes.

One of the finest electrical plants in the United States is that built by the Pawtucket Gas Company, at Pawtucket, R. I., shown in Fig. 2. The illustration is taken from a photograph in the engine room, and shows but a small part of the entire plant. We hope at some future time to give some illustrations showing various other portions of this same plant. This view is taken in the engine room more particularly for the purpose of showing the style of roof which was designed and built by the Berlin Iron Bridge Company. The peculiarity in the construction of the roof is that it is covered with their patent anti-condensation corrugated iron. In a place of this kind it is very necessary that not a particle of water should drip from the roof trusses, and the Berlin patent was adopted in order to prevent condensation on the underside of the roof. It has worked perfectly, and after being in use during two winters, the present winter being very severe in the vicinity of Pawtucket, R. I., it has shown no signs whatever of any condensation on the underside. The same kind of roof was used on the new station for the Narragansett Electric Light Company, at Providence, R. I., with equally good results, and we understand that the Berlin Company have adopted it universally for electric light stations and other places where drip from the corrugated iron is injurious. If this problem has been solved in such a simple and economical manner, the Berlin Company are to be congratulated, as it has been one of the objections to iron roofs in the past.

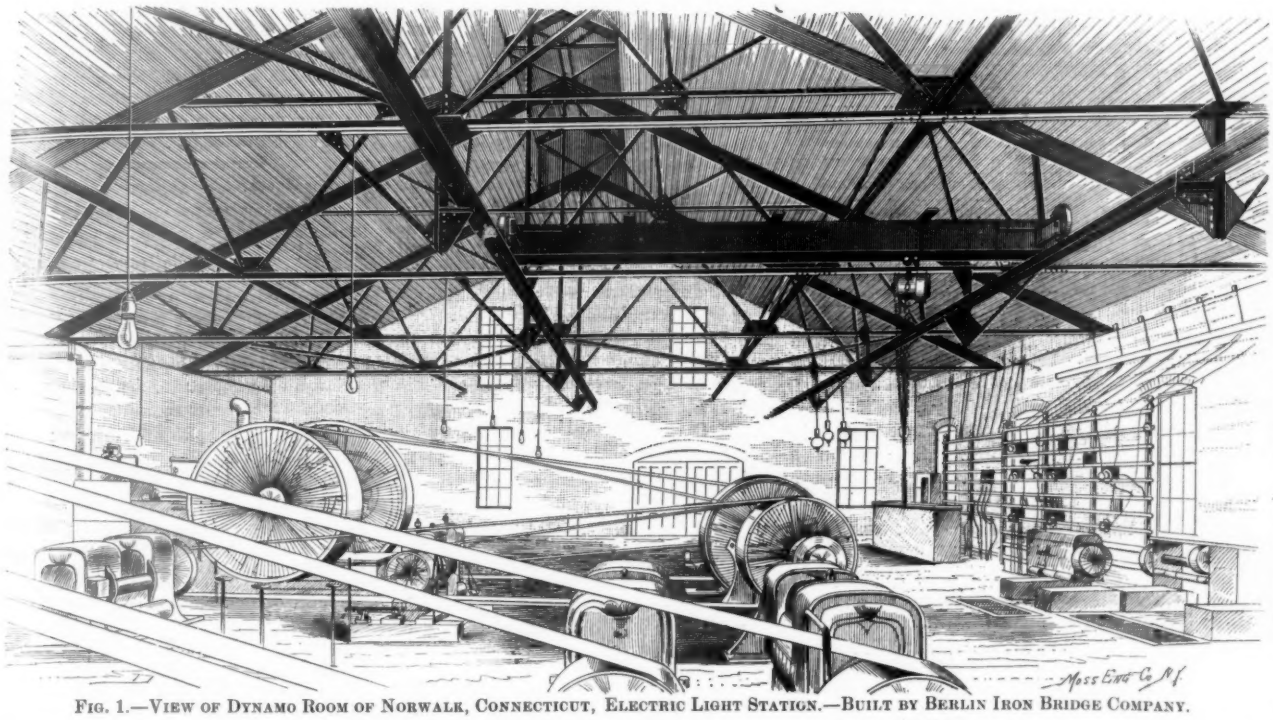


FIG. 1.—VIEW OF DYNAMO ROOM OF NORWALK, CONNECTICUT, ELECTRIC LIGHT STATION.—BUILT BY BERLIN IRON BRIDGE COMPANY.

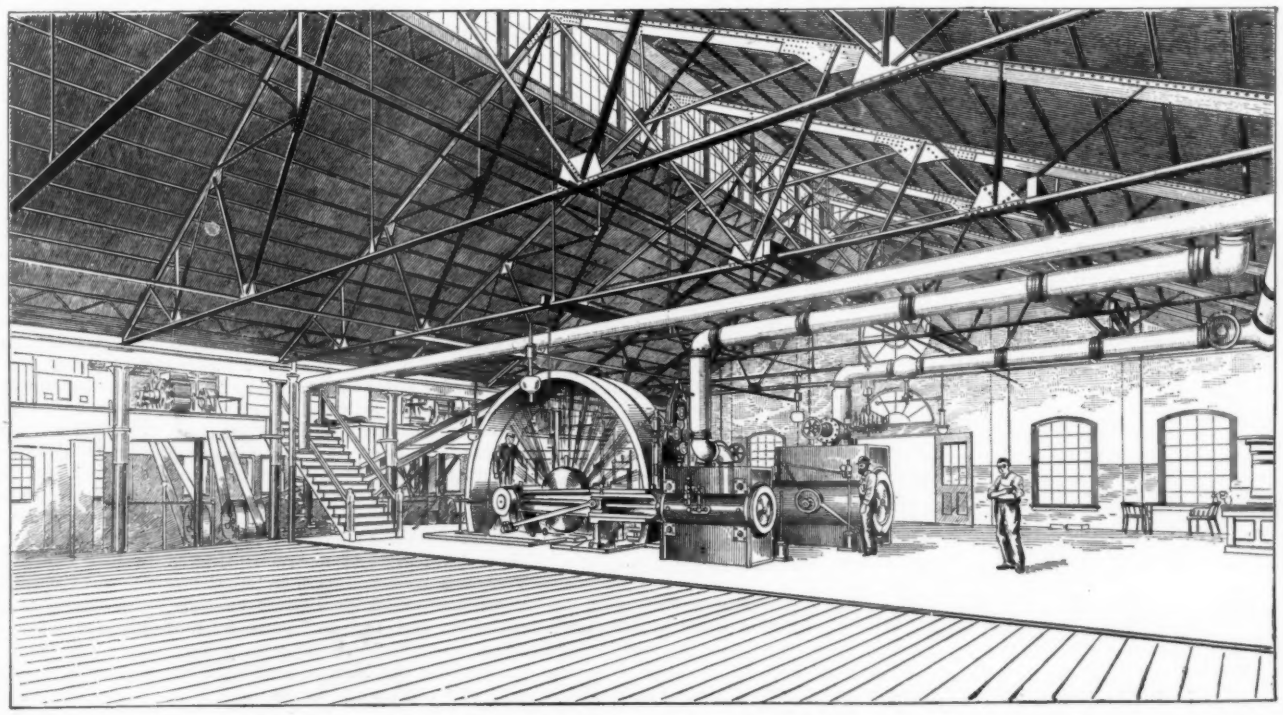


FIG. 2.—VIEW OF ENGINE ROOM OF THE PAWTUCKET, RHODE ISLAND, ELECTRIC LIGHT STATION, SHOWING SPECIALLY CONSTRUCTED ROOF BY BERLIN IRON BRIDGE COMPANY.

The REVIEW recently presented an illustration of the interior of the handsome machine shop of the Ball & Wood Engine Company, at Elizabeth, N. J. The design of this structure has been much admired by our readers. It was also the work of the same company that designed and built the above stations, and adds another to the constantly increasing list of edifices that the Berlin Iron Bridge Company can point to with pardonable pride.

Quicksilver.

The quicksilver trade of the world is controlled by the Rothschilds. The San Francisco market is the distributing point for the product in this country. During the year there were received at that point 20,000 flasks, against 14,982 in 1891, and 12,947 in 1890. The water shipments from that point consisted of 4,300 flasks to New York, and 3,808 flasks exported, the total being of the value of $304,500, against shipments of 4,046 flasks of the value of $175,730 in 1891. In the first 11 months of 1892 there were shipped overland 13,912 flasks, valued at $587,816, against 10,213 flasks of a value of $465,147 during the same time in 1891.

All the street railway franchises in Providence, R. I., are said to have been purchased by a syndicate, in which Thomson-Houston people are largely interested. This city will soon be without a single horse car, electricity supplying all transit facilities.

Rights of Electric Cars.

The Supreme Court of Pennsylvania recently delivered an important opinion defining the law upon the new conditions growing out of attempts to secure "rapid transit" on the surface of crowded city streets by means of cable or electric cars. At about 8 o'clock on a dark evening in April last, in the city of Pittsburgh, Robert Winter drew up his team in front of a business house at which he was to unload a safe. His horses were across a track on which electric cars ran on a descending grade. A car came down this grade, the motorneer was unable to stop his car in time, the team was injured. Winter sued the railway company and recovered a verdict. The Supreme Court reverses the judgment.

Judge McCollum says: "In the presence of these conditions his action in obstructing the road was negligent and reckless. It was not only an unjustifiable interference with public travel, and an inexcusable exposure of his own and the company's property to injury and perhaps destruction, but it imperiled the lives and limbs of the company's employés and passengers."

The justice thereupon lays down the following rules for people who may hereafter venture to use streets occupied by such railway lines:

"Now that rapid transit is recognized and demanded as essential to the prosperity of and the transaction of business in our large cities, the use of streets for individual convenience is necessarily qualified so as to make that transit possible, and to minimize its dangers. The substitution of cable and electric cars for the horse car and the omnibus is a change which renders impracticable and dangerous certain uses of the streets which once were permissible and comparatively safe. It introduces new conditions, the non-observance of which constitutes negligence. It is the duty of property owners on streets occupied by cable and electric lines of railway, and of persons crossing or driving upon such streets, to recognize and conform to these conditions. The risk of a crossing or possession of the tracks of a railway operated by horse-power is not to be compared with the peril involved in a crossing or occupancy of the tracks of a steam, cable or electric railway. The conditions are materially unlike in the size, weight and speed of the cars, and in the power by which they are moved."

ELECTRICAL REVIEW

Published at 13 Park Row,
P. O. Box 3329. NEW YORK.

EDITOR:
CHARLES W. PRICE.
ASSOCIATE EDITORS:
STEPHEN L. COLES.
ROBERT H. READ.

REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.

"1546 CORTLANDT." TELEPHONE CALL.

BOSTON OFFICE:
H. G. TUCKERMAN, Room 29, 620 Atlantic Ave.

WASHINGTON OFFICE:
GEO. C. MAYNARD, 1409 New York Ave.

CHICAGO OFFICE:
MERWIN J. BULKLEY, 435 "The Rookery."

ADVERTISING DEPARTMENT,
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One Year, Foreign Countries, - - 5.00
Single Copy, - - - - - - - .10

NEW YORK, FEB. 18, 1893.

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We will all meet at St. Louis.

Look out for the ELECTRICAL REVIEW next week. You may be the victim of a surprise.

Just now there is a lull. But should that lamp decision favor Goebel, jumping Mercury, won't things be lively!

"We appreciate the value of your paper, and it is one of the electrical papers that we read with a great deal of pleasure and interest," Mr. Alfred Clarke, of Lowell, Mass., writes the REVIEW. Mr. Clarke is evidently a gentleman of excellent judgment and fine discernment.

DeWolf Hopper has added to his fame. He sung the first song and told the first funny story over the telephone wires connecting Boston and Chicago. No doubt the chestnut trees along the line gracefully bowed their acknowledgments as the narrative sped on its way rejoicing.

It is now claimed that there is such a thing as "electrical sunstroke." The workers around electrical furnaces in which the metal aluminum is produced suffer from "electrical sunstrokes." The intense light causes very painful congestions, which cannot be wholly prevented by wearing deep colored glasses.

Is it to be Edison or Goebel? Echo answers: "Ask Judge Colt!"

Our wise law makers about this time of the year tackle with great zeal the question of reduction of telephone rates.

"Telepham" has been suggested as the word to express a telephone message. Too long. "Tel" would be better.

When the electric light man was asked what he did when people complained of the lamp, he said, "We make light of it."

We never remember to have seen more interest taken in an electric light convention than in the one soon to be held in St. Louis. Some lively discussions are evidently on the tapis.

Think of the interest the holders of Drawbaugh telephone stock must take in the claim of Goebel. Should he win, each and every one will feel more than ever that he was the victim of misplaced confidence.

Over in Boston the Pennock primary battery is spoken of as possessing the "most marvelous electrical invention of the age—a voltage distributor." It will prove a greenback "distributor" to those who invest in it.

An Indiana judge wisely decides that a telegram sent to a daughter informing her of her mother's dangerous illness is a work of necessity. This evidently means that the telegraph company could transmit such a message on Sunday without being liable under the "Blue laws." Again we say, wise judge.

We have received a copy of the "Transactions of the American Society of Mechanical Engineers," for 1892. This thirteenth volume, 700 pages in length, contains matter of the usual good quality found in the proceedings of that society, and is well illustrated with about 150 cuts. It contains much practical information and will amply repay one for a careful perusal.

Brooklyn is now agitated over the question of efficiency of its fire department. We think the city has a capable force, lacking, however, in numbers and equipment. It has grown faster than the department, and the remedy is one easily applied and should be made promptly. By the way, it may not be generally known that, in the opinion of those best able to judge, New York city has the best disciplined and most efficient fire department in the world.

The financial editor of the New York *Independent*, after an examination of the average first cost, running expenses and receipts of 22 trolley, 45 horse and 10 cable railways, finds that the advantage in cheapness in favor of the trolley is great enough to allow a horse railroad which is just paying expenses to be converted into a trolley and earn $350 more a mile annually in clear profit above the expense of changing. The phenomenal rate at which horses are disappearing from the streets of the average city would indicate that owners of street railways had discovered this fact, also.

Consul Fechet, in Consular Reports for November, 1892, in his report on "Mexican Trade and How to Secure It," states that "machinery of all kinds moved by steam, electricity, water or animal power is free of all custom duties." This is possibly due to the fact that the Mexican authorities are anxious for machinery importations from the United States and offers "duty free" as an incentive. He also declares, in his report, that owing to the fact that only the metric system is used in Mexico, many firms employing the English system have failed to receive orders. In many cases the prospective buyers to whom the catalogues were sent were unable to understand the system, and for this reason the orders were given to European houses, who, possibly aware of this fact, printed catalogues, using the metric system.

WHAT ELECTRICITY CAN DO FOR WHISKEY.

Courtland Bronson, an inventor of Hamilton, Ont., has received a patent from Great Britain for an invention whereby he cools whiskey to about 70 degrees below zero and passes a current of electricity through the alcoholic solution. He claims that by this process he can make raw whiskey into 20-year old whiskey by removing all impurities. The "whiskey trust" has furnished him with a certain amount of money to carry on his experiments, and he says that should a "royalty" arrangement be decided upon, the "castle in Spain," which the inventor already possesses, has a cash valuation of $16,000,000.

A CABLE TO HAWAII.

It is evident that these islands of the Pacific are destined to become part of the United States. The laying of a cable by the government is very necessary. We do not think that as a private enterprise it would be a satisfactory investment, at least for several years. Mr. Murat Halstead, the able editor of the Brooklyn *Standard-Union*, describes the whole situation as follows:

Minister Stevens is the man we wanted at Hawaii. He has executive capacity. He has international ability. He knows just how to do an unauthorized thing so as to make it authoritative. He is not ticklish about what people say. He saw that the thing demanded was not talking on his part, but action; then the other people could talk as much as they pleased. The way to place Hawaii under American protection was to put up the flag and protect it with the bayonets of the marines, and so the protectorate is established.

Now let us see somebody disestablish it. The points of possession are ours. There is nothing to do but hold the islands. Here was the chance of an age, and Stevens saw it; and, as "Envoy Extraordinary and Minister Plenipotentiary," he picked it up and gathered it in, and there it is safe as an egg in a basket; and England is not about to roar. The fact is, England is not displeased to stand back and see us get a few islands. England is not quarrelsome. She has a great principle, and it is that Germany shall not gobble those islands.

Now let an appropriation go with the old flag—an appropriation for a cable. We need a cable at once from San Francisco to Honolulu.

"Fire and Building Regulations in Foreign Countries" is another of this valuable series and is also a collection of information gathered by our Consuls. Accompanying this volume and bound with the reports is a supplement on British explosive laws. This is agreeable reading and is made doubly interesting by the introduction of numerous anecdotes and experiences.

In a recent issue the London *Lancet* calls attention to a note of the Lyons' Medical School, respecting the use of the telephone. For ears that are not specially sound and healthy the professor considers the telephone positively injurious, and even in a comparatively robust organ its continuous use, he says, "is followed by symptons more or less grave—cephalalgia, vertigo, hypeocesthesia, insomnia and sometimes physical disturbances of a character which might become chronic." He, therefore, counsels a sparing use of the instrument in the case of those whose ears are sound, and an absolute abstention from it in those whose organs are weak or imperfect.

Electricity is now quite a large factor in the improvements that are to come in the navy. Much money is being spent at Annapolis to teach the cadets the theory and application of electricity. Every ship that the government is having built is being equipped with electrical apparatus. Notwithstanding which, four ensigns who were before the examining board last week refused to answer the questions which were propounded by the board, and these objections were sustained. Naval officers who come up for examination hereafter must be prepared to answer any questions put to them on electrical matters. We would like to hear the answer to the query, "What is electricity?"

CORRESPONDENCE.

OUR CHICAGO LETTER.

It Has Been Whispered among the knowing ones that the Chicago Edison Company were about to secure control of the Chicago Arc Light and Power Company, and although they had very good reason for believing such to be the case, it could not be said positively. The REVIEW representative, however, called on Mr. Samuel Insull, president of the Chicago Edison Company, to learn if there was any truth in the rumor, and learned from him that the report was true, that the Chicago Edison Company had absorbed the Chicago Arc Light and Power Company, and that the stock was now being deposited and the deal assured. The absorption of this company will be very valuable to the Chicago Edison Company, inasmuch as they control a very valuable district and also an exclusive right to build conduits with the privilege of renting in the city of Chicago.

The Central Electric Company have sold within the last few days upwards of 1,000,000 feet of Okonite in assorted sizes. The trade in this favorite brand of wire seems to be on the increase, and despite the heavy demands made upon the Central, they are able to keep pace with the progress and to satisfy their customers as usual. The sales of the Washington carbon, which has come to the front in the hands of this company, have been enormous, and the factory has been compelled to double its capacity. This condition of the trade speaks well for the quality of the carbons furnished and also for the enterprise and push of the Western agents. Interior conduit has been very active during the past week, several of the larger buildings being equipped with this well known system. Mr. Romaine Mace, the genial representative of the company is in the city, and makes his headquarters with the general Western agents, the Central Electric Company.

Business Notes.—George Cutter has returned from the East well pleased with contracts for enamel rheostats and heating devices. Mr. McKinlock, of the Enterprise Electric Company, reports business good, and during the past month received many orders for key sockets and wire. Chas. G. Armstrong, the electrical expert of the Auditorium, is planning the circuit for the new 10 story Congress Hotel, in which over 30 miles of rubber wire will be used. J. F. Cummings, of the firm of Cummings & McCoy, Detroit, Mich., stopped in Chicago this week *en route* to Milwaukee, where he will figure with parties who contemplate using their patent electric underground system. L. E. Meyers, the busy representative of the Detroit Electrical Works, is still hustling throughout the Western country, and will no doubt return with another good contract added to his list. Messrs. Taylor, Goodhue & Ames report a very large trade on Diamond transformers. They have been most successful in placing them in the principal cities throughout the United States, and from reports received the transformers are giving most complete satisfaction. Manager Englund, of the International Registry Company, is in high spirits over the receipt of some very large orders for registers made by his company. Although this is their dull season, business has continued good throughout, and this year gives promise to be most satisfactory.

Chicago, February 11. M. J. B.

OUR BOSTON LETTER AND NEW ENGLAND NEWS.

The Springfield Switch and Motor Company are progressing steadily with the manufacturing of their apparatus, and will soon be in shape to put them on the market.

The Davis Electrical Works, Springfield, Mass., are doing a tremendous business in renewals of burned out incandescent lamps. Their large plant is running to its full capacity, and is still unable to keep up with orders.

The Mather Electric Company have placed one of their 350 light machines in the mill of the Briggs & Allen Manufacturing Company at Lawrence, Mass., and another of the same size at the plant of the Rodney Hurst Machine Company at Orange, Mass.

The Elektron Manufacturing Company, of Springfield, Mass., have just shipped the entire apparatus for an isolated electric light plant, including engine, boiler and one of their 125 light machines, to Havana, Cuba. They also report the electric elevated business on the boom. Two have already been installed in Springfield, and two more are being put in.

Electricity is rapidly coming into favor as a motive power among the large mills and manufactories in New England, and as soon as the first cost of installation is somewhat reduced, as it is sure to be, it will become a very important factor in mill work, its simplicity, cleanliness and safety making it especially valuable. Several large concerns in Lynn and Brockton, Mass., Taftville, Conn., and Portland, Me., have already adopted the electric motor in place of the steam engine, and others will soon follow this example.

The Opening of the Electric Road between Lynn and Salem, Mass., forms another link in the chain which is gradually connecting the outlying cities with Boston, and there is some talk of extending this line to Gloucester or even as far as Newburyport. If the latter plan is carried out, it will connect with the proposed system between Manchester, N. H., and Newburyport, Mass., passing through all the large towns on the Merrimac River, and forming an unbroken connection between Manchester and Boston. The tendency would be to develop the country between the various towns along the line of the road, not only with residences, but business interests as well.

The New Brick Extension to the plant of the Billings & Spencer Company, of Hartford, is now almost completed, and presents quite an imposing appearance. It forms the left wing of the main structure, and has a frontage of 228 feet on Lawrence street and 170 feet on Russ street. It is two stories in height above a brown-stone basement, and has a depth of 40 feet. At the corner it rises to three stories in height, and the main offices will be located here when completed. In addition, they have just finished a shop 40 feet square and 20 feet high, for hand blacksmith work. The forging department has grown considerably during the past year, and they are now running 50 drop hammers, weighing from 400 to 2,000 pounds, and the largest frames eight tons.

Judge Colt, of the United States Circuit Court at Boston, is at present the most prominent figure before the eyes of the electrical fraternity, in this part of the country at least. His decision in the Edison–Beacon case is awaited with great anxiety, not only by the lamp manufacturers, but by those interested in nearly every other branch of the trade. A trip through New England discloses that business is almost at a standstill for the present, and is likely to be until the decision is rendered. Manufacturers of switches and sockets especially are in a bad way, leaving large orders on hand which cannot be shipped, the supply men and central stations being afraid to lay in any stock until they know whether they will be allowed to use it. This state of affairs is causing much embarrassment, and all eyes are turned toward Boston in expectation of a speedy settlement of the difficulty.

Messrs. Waterhouse, Gamble & Company, of Hartford, Conn., have organized an European branch under the title of the Waterhouse Electrical Manufacturing Company, Limited, with a capital of £20,000. A factory has been built for the manufacture of the Waterhouse arc lamp under exisiting English patents, and a complete outfit of the special tools used here has been shipped. Mr. A. G. Waterhouse is now in London, instructing the men in the use of these tools, and expects to make a stay of about four months. The offices of the concern are located at 33 Old Broad street, and the factory at 67 Southwark Bridge Road, London, S. E. From private advices Mr. Waterhouse seems to be much pleased with the condition of the electrical field abroad, and finds himself even better known, from a scientific standpoint, there than in this country. This can only be accounted for by the fact that on the other side inventors and their works stand on their merit, and are not so largely dependent on a heavy financial backing to obtain recognition.

The Much Talked of Westinghouse Lamp has at last made its appearance in this city, and can be seen at the offices of the Westinghouse and Sawyer-Man Companies at 620 Atlantic avenue. The lamp is artistic in appearance, and, so far as can be judged by the extremely short trial given it when exhibited, burns well. The separable parts are mechanically well made and easy of adjustment, and it is supplied with an extra cup to fit any make of socket, although naturally the company prefer to furnish their own socket, which is claimed to be superior to anything yet put on the market. The filament is somewhat shorter than the old style of lamp and the bulb a trifle longer, to allow for the necessary shortening in the process of removal. The Westinghouse Company are not yet prepared to fill any large orders, but are placing small lots as sample orders, and in this way keeping them before the trade. There is considerable diversity of opinion among the trade as to the lasting qualities of the lamp, many being somewhat sceptical on this point, which, of course, can only be settled after a trial in actual service. H. G. T.

A New York syndicate is contemplating the purchase of the Mt. McGregor, N. Y., railroad. Should the purchase be made the trains will be operated by electricity.

PERSONAL.

Mr. Wm. Stanley, Jr., electrician of the Stanley Electric Manufacturing Company, Pittsfield, Mass., was a recent visitor in Buffalo, N. Y.

Mr. Ernest A. Lowe, formerly with Pearce & Jones and Western Electric Company, has been appointed manager of J. Jones & Son, 39 Vesey street, New York.

Mr. L. S. Dumoulin has resigned as chief electrician of the West End Street Railway Company, Boston, to engage in private business. Mr. Pearson has also resigned but will act as consulting engineer.

President H. B. Stone, of the Chicago Telephone Company, announces the appointment of Mr. A. S. Hibbard as general manager of that company, with offices at 203 Washington street. Mr. J. E. Zeublin, acting superintendent, has been appointed general superintendent of the company by Mr. Hibbard.

Mr. C. F. Johnson, of the Palace Hotel, San Francisco, where he has charge of the electric lighting system, was a New York visitor recently. The plant, as was recently mentioned in the REVIEW, was inspected for final approval by Dr. A. V. Garratt, former secretary of the National Electric Light Association, who is at present successfully engaged in electrical engineering at Spokane Falls, Washington.

Jesse H. Bunnell, the well known electrician, and Mr. Bourke Cochran, the famous orator and politician, can't agree about a road out on Long Island where they both have country places. The electrician wants an open line, the statesman prefers a closed circuit. At last accounts, about 700 tons of stone and dirt has been dumped on the road, and travel over it was, to say the least, somewhat arduous. But the end is not yet, and the REVIEW feels safe to pin its faith to the ultimate success of the practical man as against the statesman.

Commander Washburn Maynard, who has been in command of the "Pinta," in Behring Sea, for the past year, has just been assigned to duty in Washington, as superintendent of the Naval Electric Lighting Bureau. Commander Maynard has had much experience in electric matters, and is considered as one of the most accomplished and practical electricians in the navy.—Commander Newell will be given sea duty as soon as he recovers from a long illness which has kept him from active service.—Ensigns Blandin and Bullard remain on duty in the Lighting Bureau.

What May be Expected.

Boston subscriber—"Ah! yes, I beg your pardon; but would you be kind enough to lend me your ear for a short period; and you would also oblige me and shorten the duration of time during which I am articulating brief and intelligent sentences into the transmitter of this telephone set by making prompt, firm and accurate electrical connections between my telephone and the telephone of the individual to whom I wish to communicate in your inland metropolis."

Voice at the Chicago end of the line, to next operator—"For lands' sake, Katie, its them Boston people again!"

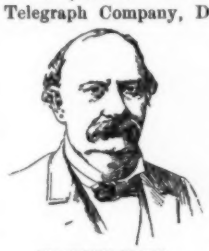
To Terminate Trusts.

Mr. Scott, of Illinois, has offered in the House, in Washington, a bill amending the Anti-trust act, so as to require the attorney general, upon oath of 10 reputable citizens that a trust or combination exists, to enquire into the matter and prosecute all persons who are parties to the combination.

In case a trust is found to exist in respect to any article upon which the duty is now levied, the tariff on it is to be removed. Any property owned under such contract or trust in the course of transportation is liable to seizure and forfeiture to the United States. Any person whose business or property is injured by a trust is authorized to sue in the United States District Court and receive three-fold damages sustained.

Death of Dr. Norvin Green.

The president of the Western Union Telegraph Company, Dr. Norvin Green, died at Louisville, Ky., Sunday morning, February 12. He was born in New Albany, Ind., April 17, 1818, moving to Kentucky at an early age. Dr. Green was educated as a physician, but became interested in telegraph matters, and in 1878 was elected president of the Western Union Telegraph Company, and remained in that highly responsible position until he died. Dr. Greene's widow, four sons and two daughters survive him. The funeral is to occur Wednesday at Louisville.



DR. NORVIN GREEN.

Dr. Green was a very popular and capable official, was an orator of no mean ability, and possessed a very wide acquaintance and many warm friends.

It is thought that either Mr. Geo. J. Gould or Gen. Thos. T. Eckert, now first vice-president, will succeed to the presidency of the Western Union.

The Chicago-St. Louis Electric Railway Bill in the House.

Senator Morrill has asked that the Chicago-St. Louis Electric Railroad bill be recommitted to the committee on finance, and the order was made. The bill was reported favorably a week ago by the committee on commerce after several sessions held for the hearing of those interested. Senator Morrill holds that the bill affects tariff legislation and, therefore, belongs to the committee on finance. Senator Vest made no objection to the change of reference.

Setting a Street on Fire.

The electric road track at Fonda, N. Y., has been laid in the main street, and was the hardest job of the kind ever done in the Mohawk valley, owing to the frost. The ground was frozen as solid as a rock, and to loosen the pavement kerosene oil was used. The track was strewn with loose hay, on which the oil was poured, and when fired the street seemed in a blaze. Forty-three barrels of oil were used in this manner. Since then the electric cars have arrived, and the work will be carried on with all possible dispatch.

The Telephone Booth Girl and Her Protectors.

The telephone girls in hotels are well protected. All of the big hotels have detectives in citizen's clothes constantly on duty, and all a girl has to do is give a nod to receive assistance. Hotel Vidocqs are, as a rule, athletic and able to cope with a giant. Recently a half drunken man stumbled up to the telephone and began to annoy the girl on duty. In two minutes the intoxicated fellow was collared and propelled to the street with such vigorous kicks he will not forget the incident to his dying day. The bookstand boys, the hotel clerks, the porters and other employés of the hotels all stand ready to help the telephone girls.—*New York Commercial Advertiser.*

A Gigantic Globe.

An interesting feature of the governmental exhibit at the World's Fair will be a model of the earth, with all the geometrical accuracy that mechanism and art can give to such a difficult representation. It is intended to form a part of the exhibit from the General Land Office of the Interior Department. A circular apartment in the center of the globe's pedestal will contain interesting tabulated statements of the condition of the public lands. The room will be 15 feet in height, with a convex ceiling formed by the lower part of the globe. An interior stairway will afford access to a balcony around the base of the globe, which will be supported on a horizontal axis, turned by a small motor, instead of being placed at an angle of 67½ degrees, as the world is actually hung in space. The globe is about 63 feet in circumference, with a diameter of 20 feet, superficial area of 1,256 feet and weight of 4,000 pounds. It will bear upon its surface representations of the land and water on a scale of 69 miles to 13 inches, measured at the equator.

Electrical Recording Meters.

A PAPER READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK, JANUARY 17, 1893, BY CARYL D. HASKINS.

(*Continued from page 284.*)

The Aron meter, the typical meter of this type, proved itself so accurate at the recent meter competition in Paris, that it succeeded in dividing the first prize of 10,000 francs and a gold medal with the Thomson recording watt meter, the principle of which we shall consider later. Your attention may be directed to the fact that the Aron meter is a watt-hour indicator, something unusual, for almost everything considered up to the present point has been typically an ammeter or a modification of an ammeter.

Briefly, the principle of cone instruments is about as follows: Let us assume a wheel rotating at a constant speed; let us assume a cone mounted on a shaft on which it is free to rise and fall; let the cone rise and fall with one of its sides in a vertical plane with the periphery of a constantly rotating wheel; the speed of the cone regulates the speed of rotation of the recording gear, and the position of the cone is determined by an indicator device which obviously must be of high torque, because friction must be a more or less serious factor. Some very fair instruments of this class have appeared from time to time. One of the most ingenious of them provides two cones, or rather two cone-like drums, somewhat like a beehive in shape. One of these cones is rotated at a constant speed, and the other is inclined on a movable right angle axis in such a way that its point of contact with the neighboring cone varies with the load—the same end being accomplished as that in the rising and falling cone just described without the introduction of as much friction. This is a type of the Maxim meter.

Another similar device provides for a small wheel rising and falling between two cones whose inner sides are parallel, thus transferring the power from a constantly rotating cone to a cone with varying speed, the same object and end being accomplished in all cases, and invariably involving friction.

Another form of cone meter, still a clock meter, differs somewhat from those just described. Let us assume a conical drum, shaped like the bullet of an ordinary rifle, and some four or six inches in diameter at the base, rotating at a constant speed by a clock mechanism beneath it; let us suppose a spool of thread to be placed upon a pin a foot or so removed from the drum; the thread from the spool is attached to the drum which should be covered by some felt like material; the thread passes through an eye or ring which in its turn is attached to an indicating mechanism. It is apparent that the indicator will raise and lower the spring according to the amount of current or energy passing. Since the drum rotates at a regular speed, the thread will be wound onto the drum and the point where it is wound on will depend on the position of the indicator. Thus, if the load were very small, the indicator would be at its highest point and the thread would be wound around the smallest diameter of the drum. As the load increased the indicator would be depressed and the thread would be wound on a greater diameter of the drum. The inspector of meters, on his monthly visit, would remove the thread which had been wound onto the drum, measure it on a yard stick, and ascertain perhaps that the consumer had used 15 yards of electricity. This is certainly reducing things to a very practical standpoint.

There is one other class of clock meter which actuates a dial or recording train, and for the typical instrument of this class we will select the Pilkington-White meter. This instrument has a wheel rotating at a constant speed; into this wheel are inserted a number of pins of different lengths, projected from the face of the wheel parallel to its axes: a lever arm whose position is determined by the indicator mechanism is so placed that it shall engage with these pins. If the load be light it will only engage with the longest pins. If, for example, the load be one lamp, then the lever will engage only with the longest pin. On engaging with the pin, the lever is pushed in the direction in which the wheel is rotating, and gives an impulse of one tooth to the recording wheel. Thus, on the light loads the meter would receive but one impulse for every revolution of the motor wheel, and just in proportion as the load increased, so this lever would engage with more pins and more frequently actuate the recording dial.

This meter is very good in many respects; but it should be noted that it reads to points. There is necessarily a limit to the number of pins which can be used, and with a 100-light meter, having, we will assume, 10 pins, it is clear that there can only be 10 variations in speed from one lamp to full load, consequently the speed will only change every 10 lamps, and we should get the same record on 19 lamps as on 10. The figures which I give for a 100-light meter and 10 pins are purely arbitrary and not representative of the number used, but are given to indicate the idea which I wish to convey.

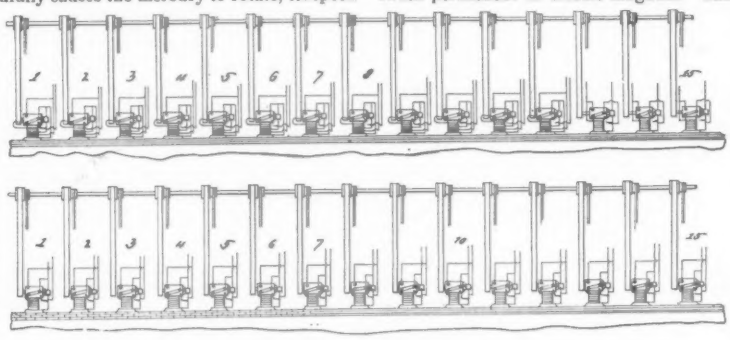
In the majority of cases motor meters have been designed for alternating circuits, and these again naturally divide themselves into two classes, those actuated by inductive principles and those whose motive powers act direct, and which are similar in character to the electric motor. Of the first class there is a large number, designed, of course, for alternating circuits.

These are almost exclusively of two forms—the wound and the unwound armature types. But few, if any, of the former are in practical use, though several have, I believe, shown very fair results. As a rule, they consist of a field formed of a coil or coils in series with the lamps, and a small drum, or other closed circuit armature, preferably without iron, whose commutator is short-circuited across by directly connected brushes, or other similar means. This meter will record with considerable accuracy, but in the presence of better and simpler plans it has not met with general favor.

None of the inductive meters will run on direct current, of course. We now come to the second form of motor meters—those which are not dependent upon inductive action for their rotation, and are consequently equally serviceable for alternating or direct circuits.

Of these there are but a few, all of them having a field in series with the lamps and an armature—sometimes in series and sometimes in shunt. Of the former kind but few have been tried carefully enough to thoroughly prove their merits.

Perhaps the most successful of these has a heavy iron field, with resultant poles above and below a shallow basin of mercury. The current for the lamps passes through a copper coil around and excites the field, thence through the mercury from a portion of its periphery to center, or *vice versa*. This naturally causes the mercury to rotate, its speed being proportional to the amount of current, minus, of course, the effect of friction, the mercury in this case forming the armature.



THE BRADLEY SYSTEM OF POWER TRANSMISSION.—A SERIES OF FIFTEEN GENERATORS AND FIFTEEN MOTORS.

Friction is balanced in this meter quite successfully by the introduction of a fine coil of high resistance around the field. This coil is "in shunt across the line," and serves to intensify the field on the lower readings, while on the higher ones it bears too small a proportion to the total field to exert any appreciable influence. This coil can be nicely adjusted to balance friction by varying an outside resistance.

While such a meter has many weak points, still it has one marked advantage, the balancing of friction. This cannot be given too great importance in motor meters, for friction is their weakest point, and by successfully neutralizing this, they may be brought to almost any degree of accuracy, provided always that their fundamentals remain proportional throughout.

The remaining class of motor meters embraces those with a series field and shunt armature. These are somewhat of a departure from the others, since they are not current meters, but power or watt meters. Their construction is in all cases quite similar to an ordinary shunt motor, the conditions of field and armature being reversed.

The field is in series with the lamps; the armature, which is of high resistance, and generally of Siemens construction, with a commutator of a few segments, is placed "in shunt across the line," the shunt being taken off beyond the field coils. An outside resistance is placed in this shunt circuit, to reduce the current in the armature to the necessary small quantity and to prevent any appreciable waste across the line.

The strength of armature, then, may be seen to be dependent on the pressure, whilst that of the field depends on the expenditure of current. The torque of this meter, then, is directly proportional to the power passing, and the speed is naturally proportional to the torque (again minus the friction), but the friction is balanced in these meters, as in the previous one, by the pressure of a "shunt field," since the armature circuit is taken off beyond the fields, and, consequently, passes through them in addition to the current for the lamps. As in the previous meter, this serves to counteract the retarding influence of friction in the lower readings where it is dangerous, whilst in the higher ones it bears so small a proportion to the total field as to be unappreciable. This meter is, of coure, equally useful without change of calibration on either a direct or an alternating current of any frequency.

Motor meters, as a class, rotate far more rapidly than is allowable in practice. It has been found necessary, therefore, to introduce a "drag," or resistance to rotation, to slow the meter to a reasonable speed. This has been done in several ways; perhaps the most common method being to attach to the shaft a number of air fans. These are quite largely used, and with fair success. The resistance of an air fan to rotation is approximately proportional to the square of the speed. Therefore, this device is only fitted for combination with such meters as have a torque increasing with the square of the current. But since the torque of such meters does not quite reach the square, the retarding effect increases rather too rapidly, and has a tendency, though not always pronounced, to cause the speed of the meter to fall off proportionately on high loads.

An effort has been made to overcome this disproportion of the fan's resistance by substituting folding fans which close by centrifugal force, on the principle of the steam engine governor. This novel idea, whilst a decided improvement, scarcely overcomes the difficulty.

Another method of drag, which has been used with some success, is the rotation of a small fan in a liquid, a method perhaps rather better than the previous one, since resistance to rotation falls below the square of the speed, when the liquid itself begins to rotate. Much depends in this case on the shape of the receptacle containing the fluid.

A third method, certainly by far the best, consists in rotating a small inefficient dynamo, generally a mere disk, turning between permanent or electro-magnets. This resistance is, of course, directly proportional to the speed, and therefore to the torque, being indeed the machine reversed. By applying this drag, friction is again the only difficulty to contend with.

The greater the drag (commensurate, of course, with sufficient speed), the smaller the proportion of friction to the total load will be, and the greater the accuracy of the instrument's registration.

To sum up, then, it would seem that the most practical and useful meter, according to our present light, would be a motor meter of other than inductive type—preferably an energy rather than a current meter—with some force to balance friction, with a drag which is directly proportional to the speed, and which will be comparatively heavy, making the irregular friction as small a portion of the load as possible.

With all these features properly worked out and applied there can be no reason why a meter should not be accurate, efficient, comparatively cheap, and thoroughly able to take care of itself without undue attention.

There is another form of motor meter, somewhat akin to the clock meters, which we discussed some little time ago. This comprises those instruments whose motor would rotate at a constant speed, provided the resistance to rotation were also constant. In other words, the current passing through the meter would be so arranged as not to cause fluctuations of speed in the motor directly. This is easily accomplished by placing the motor in shunt across the line like a lamp, and properly proportioning its windings. Variation in speed of the motor which is geared directly to the dial, is accomplished in this class of meters by varying the resistance to rotation or drag. One plan suggested provides for fans which could be more or less fully immersed in a fluid, the immersion of the fan being dependent upon the strength of the current, the fan, in fact, moving up and down the shaft in accordance with the influence of a kind of indicator mechanism. Thus, on very light loads, the fan would be immersed and would strongly retard the motor, while, on very high loads, the fan would be almost removed from the fluid in which it rotated, and the motor would race in consequence.

Transmission of Power by Direct Currents.

SOME NEW AND VALUABLE IMPROVEMENTS BY CHARLES S. BRADLEY.

We have heard and read much lately of long distance transmission of power by alternating currents, the enormous advantage offered by this character of current being that its transmutation from one tension into another may be so easily effected by means of the inductive transformer. The limitation, however, imposed by the nature of an alternating current is that unless three or more line wires are used so as to convey two or more sets of alternating currents of differing phases, no economical means of converting the energy of the current into mechanical motion, or in other words, no efficient motor has yet been presented. One or two types of single phase alternating current motors having a claimed efficiency of as high as 50 per cent. have been developed, but the heating and difficulty with the commutator has prevented a general public use. The polyphase motor is more efficient and very simple in construction, but, as above indicated, requires for its successful operation three or more wires to transmit phasially different alternating currents. It is somewhat strange, in view of the difficulties met in operating alternating current motors, that the attention of engineers has not been concentrated upon the development of some method for transmitting direct current over long distances. Such a system is now at hand and is made the subject of a patent recently issued to Mr. Charles S. Bradley, who has been an active worker in alternating current apparatus.

Mr. Bradley's system of transmitting direct current involves an increase of the electromotive force of a direct current to any voltage desired, by coupling a large number of generators in series relation and converting such a current of high tension, thus transmitting over a line into motion by a series of direct current electric motors connected in series. The invention involves features for rendering this operation safe, both for the machines themselves and for the operators who attend them. Such an invention brings the direct current machine, which has a very high efficiency, into the field of long distance transmission of power. Heretofore such machines have been limited to power transmission over short distances, for the reason that the potential necessary to overcome the resistance of long lines has been destructive to commutators, and the insulation of the machines could not successfully withstand the high voltage. On the other hand a conductor of sufficient size to permit the transmission of low tension currents has been ostracised by reason of the enormous amount of copper required. Mr. Bradley's invention is designed to render practicable the development of a direct current of high potential and its re-conversion into power at the end of a transmitting line. His system consists in placing a large number of generators in series relation and thoroughly insulating them both from earth and from one another and transmitting the combined electromotive force of all the machines to line. By this arrangement the difference of potential across any pair of brushes is only that due to the electromotive force developed by a single armature, and by making this electromotive force of a degree which can be safely withstood by the commutator the system is brought within commercial feasibility. It became necessary, however, to so arrange the generators and the motors that in case of accidental ground the windings will not be injured by disruptive discharge. This is accomplished by connecting the frame of each generator and each motor with a good substantial electrical connection with the circuit, thus bringing the frame of the machine to the same potential as the line and rendering it impossible for any part of the insulation to undergo any greater dielectric strain than such as might result from the electromotive force of a single machine.

In the engravings presented herewith,

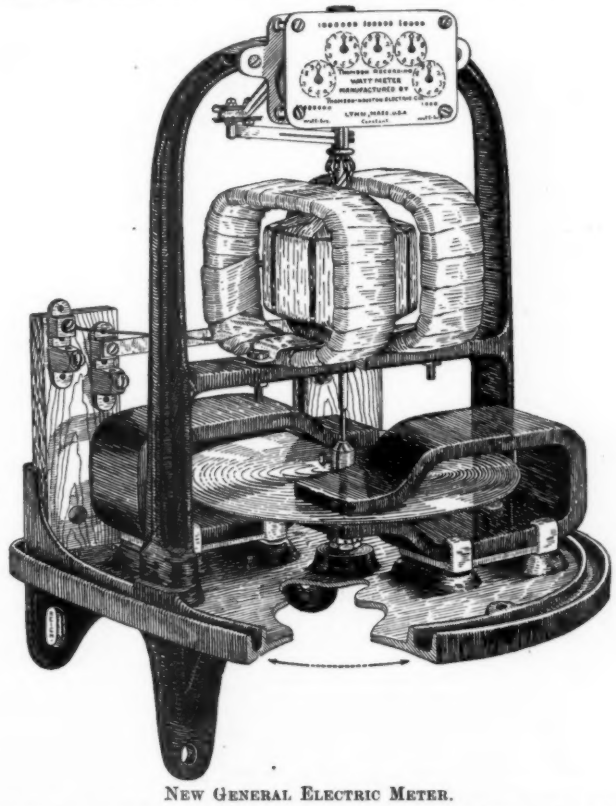
which illustrates a series of generators and a series of motors respectively, are shown 15 machines, each of which may be easily constructed to stand 500 volts, thus giving an aggregate electromotive force at the terminals of the generating station of 7,500 volts, an electromotive force which might be readily increased by adding more generators. The generators are preferably mounted upon perfectly insulated foundations, and so arranged that an operator will have to mount a series of steps before reaching the platform upon which any machine is mounted, such platform having a glass floor so that, although the operator might have his body brought to the potential of the line by an accidental contact with a metallic portion of a machine, he could receive no injury. The machines are so placed that an operator in adjusting one can by no possibility form a contact with another, the machines being placed a sufficient distance apart to provide this necessary precaution. It will thus be seen that the machines are protected against breaking down by reason of the fact that although the aggregate electromotive force is very high the strain upon any one machine is only the electromotive force of its own armature in the case of a generator, or the drop across its brushes in the case of a motor. The machines at the generating station will, where such an arrangement is available, be all connected to the same driving shaft, and similarly at the motor station the motors will all be coupled to a common shaft to be driven, and such shaft may connect mechanically with the work to be performed, or may operate any desired number of auxiliary generators for supplying distribution circuits. By placing the frame of each machine in good electric connection with one of its brushes the safety of both the attendant and of the machine is insured, because, even should a ground occur, a direct path to ground will exist, which will immediately blow a line fuse but cannot disable the machine. An important incident of this construction is that the wire insulation need not be made higher than to withstand the voltage of a single machine, which may be placed at any suitable limit, and that it would be impossible for an attendant at any time to be affected by any greater difference of potential than exists between the two brushes of a single machine. Each machine is provided with a number of switches for cutting it into or out of circuit or for regulation. The machines at the generating station will preferably be principally compound wound, and the motors will be shunt wound, thus insuring a constant potential and a current suitable to the load. A few series wound machines will preferably be included at the generating station. The motors will be provided with switches for first opening the shunt circuit and then short circuiting the armature, as indicated in the engravings. The compound wound generators will be provided with a switch by which the field shunt may be first opened and the series coils then short circuited. Line switches will be provided for cutting out any desired machine, and will be located a sufficient distance from the generator to prevent accident and arranged upon a highly insulated switchboard, enclosed in a glass casing, the part accessible to the attendant for adjustment projecting through the glazing of the casing and provided with highly insulated handles. In such a system the tension of a direct current may be raised to a point at which it may be made to economically traverse long distance and then be converted into power. As the efficiency of a direct current generator or motor may be made 96 per cent., it will be seen that, excluding the heating losses in overcoming the resistance of the line, the efficiency of such a system would be 92 per cent. at the motor shaft, or, allowing for another conversion by means of low tension generators and motors operated thereby, an all-around efficiency of 85 per cent.

If this invention realizes practically the promises made for it by the inventor, it will doubtless lead to a liberal use of direct current machinery for long distance transmission. It is a fact demonstrated by the Frankfort experiment that the rate of alternation in long distance alternating current transmission must be made quite low, as low as 20 periods per second on an hundred mile circuit, in order to have the system economically operative. Such a rate of reversal would probably necessitate the use of large transformers, a custom not in vogue in this country, where a much higher rate of reversal and smaller transformers are in service. With direct current transmission, however, the line will take a constant charge and these difficulties will, of course, not arise. The current will be generated at some suitable point where power is available, and will be transmitted to a central plant at the delivery end, from which it may be distributed in the same manner as lighting and power currents on circuits of short length are now distributed.

A Meter for all Climates.

The General Electric Company has designed and manufactured a type of meter different from the Thomson watt meter, which, while possessing all the advantages of their well known meter generally used, has special features which enable it successfully to meet the altered conditions due to climate. It is especially designed for service in hot climates where atmospheric influences are uncongenial and mephitic gases, damp vapors and minute insects prove detrimental to the ordinary type of recording meter.

The illustration will show wherein it differs from the ordinary type. It is a skeleton meter. On the upper side of the lower plate is a groove running completely around it, and into this the cover sets. The groove is filled after the cover is in place with heavy oil, gum or cement—preferably a heavy oil. The hole in the base through which the sealing plug of the meter passes is hermetically sealed by means of a soft rubber washer under the wing nut, while the leading in and leading out holes are closed around the wires



NEW GENERAL ELECTRIC METER.

by a rubber diaphragm through which the wires are punched on being entered. These meters are especially useful in such places as chemical factories, dye houses and elsewhere, and as they fill a want should find a large demand. They are made in all standard sizes up to 150 amperes, and all voltages up to 100 volts, for two wire system only, and are known as type "T."

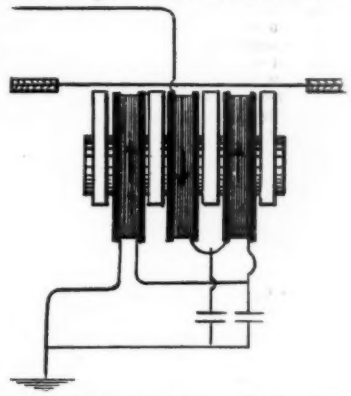
Rumor has it that the Cayadutta, N. Y., electric road is backed by a powerful syndicate, which will use the new road to demonstrate the fact that freight can be profitably hauled on a heavy grade by the trolley system.

George G. Ward.

In its "personal sketches" the New York *Record* has the following about a well known and popular official:

The mutual prosperity of the two cities of New York and Brooklyn has enlisted the active co-operation of many capable and energetic business men on both sides of the East river, and among all those engaged in enterprises having that end in view the able and earnest Geo. G. Ward stands in the front rank.

Mr. Ward is the vice-president and general manager of the Commercial Cable



FIELD'S IMPROVEMENT IN TELEPHONY.

Company, whose offices are at No. 1 Broadway, in this city, and while other able and energetic men are also interested they listen with great deference to the views of Mr. Ward and generally adopt his suggestions. The entire business interests of the country owe the Cable Company an energetic and substantial support, as the company has done so very much since its inception to promote their interests in a mercantile and financial point of view.

Mr. Ward has also completed perfect cable communication between this country and Europe, and these new arrangements cannot fail to largely promote the interest and intercourse between the two countries. One single instance will suffice. While, in the ordinary course of mail, money cannot be transferred either way between the Continents in less than from six to ten days, the cable will make the transfer in as many minutes. Mr. Ward is an accomplished and courteous gentleman having wide business experience and fund of information in regard to all subjects of interest to the general public. He is one of those self-reliant, discreet and painstaking men who have a thorough and practical discipline, and is a splendid organizer who can inspire confidence and maintain discipline among his subordinates.

His grasp of detail and prompt decision enable him to dispatch business with phenomenal celerity. Mr. Ward has the finest social qualities and often displays his generous hospitality at his elegant mansion at 146 Montague street, Brooklyn.

Telephony—A Recent Invention.

In a patent recently issued to Stephen D. Field is described an interesting winding for a receiving or transmitting instrument suitable for use in telephony and designed to remove the choking effect offered by electro-magnets to telephonic currents. The construction consists of a core wound with a coil tapped at a number of intermediate points of its convolutions, each tap connected through a condenser with the coil terminal. The construction is illustrated in the accompanying engraving, where the line current is represented as entering the middle coil, which then passes through the coil to the right in a reverse direction to the first coil, and then through the coil to the left in a reverse direction also to the first coil, and finally out. Between the successive coils are placed branches including condensers and connecting with the end of the coil system. It is well known that rapid electrical vibrations such as are used in telephony, experience a damping effect when caused to pass through a wire coiled parallel to itself, the effect being greatly magnified when the coil surrounds a core of iron, as in the case of electro-magnets. The more rapid the frequency of electrical vibrations the more damaging the effect of a given length of coiled wire. In telephonic apparatus, where a number of instruments are connected in series, this effect is sufficient to render inaudible the short impulses and allow only the slower waves to pass. In the arrangement provided by Mr. Field to overcome this difficulty it will be noticed that each coil of the group or battery of coils is provided with an independent magnetic circuit, all of the magnetic circuits co-operating with a common diaphragm, and that the arrangement of the coils is such that the retarding effect due to mutual induction between the several coils is obviated; moreover, that, whereas waves of long duration will pass through the entire coil system, those of a shorter duration will find a by-pass through the condensers without traversing the entire length of the coil. Thus a current of short duration will pass through only one coil and return by way of the condenser by-pass, one of longer duration will take two coils, and one of still longer duration may pass through three coils, and so on according to the number of coils used. The difficulty attacked in this invention is one that has a highly important bearing on telephony.

The General Passenger Agent.

In an interview in the New York *Times*, Mr. George H. Daniels, general passenger agent of the New York Central, thus bursts into poetry over the general passenger agent:

The general passenger agent is the most important man on the railroad—at least those who ask favors of him think so. The general passenger agent is a man of varied attainments. Acknowledging the press as the most mighty power of the nineteenth century, he stands in with the editor. With profound respect for the church as the guide and teacher of the world, he makes reduced rates to the clergy and runs excursions for the Sunday school for almost nothing. Believing that the stage has an elevating and refining influence upon society, he votes for party rates.

His duties are as varied and as arduous as there are days in the month. On Sunday he must attend church to prove that the railroads set a good example to the community. Monday night he must take a party of ticket agents to the theatre and show them about town, in order that they may be impressed with the liberality of the company, and in the hope that they will send their business over his line. At an early hour on the following morning he must meet the general manager at the office to discuss plans for the reduction of expenses. On Wednesday he must convince the advertising agent of each of the daily papers that he is paying him more money for time tables and reading notices than any other paper in the country. Thursday he devotes to trying to get a lot of reading notices into the papers free upon the plea that they are really items of news. Friday he spends in making a map that shows his line the shortest and most direct to every important point in the United States. On Saturday he makes out a time table that no one but the maker can read. He goes home on Saturday night with the proud consciousness that he has done a splendid week's work and earned his princely salary.

JOURNEY JOTTINGS.

CHICAGO, CLEVELAND AND BUFFALO VISITED BY OUR TOURIST—WHAT HE SAW AND HEARD PRESENTED FOR YOUR EDIFICATION AND INFORMATION.

(*Editorial Correspondence.*)

CHICAGO, FEB. 4, 1893.—Those of our readers who attend the World's Fair, and who have not been in Chicago during the last five years, will note many changes in the Windy City, nearly all of which are progressive. The advent of the "sky scraper" occurred in this town, and Chicago now boasts the tallest inhabited structure in the world. The hum of the trolley car is heard here and the electric light is omnipresent. Some of the handsomest electric fixtures I have ever seen are installed in office buildings, hotels and residences in this city.

On the way here from St. Louis, yesterday, the weather grew colder and a rain which had fallen the previous day was congealed into ice, so that in the early morning sun every tree, fence, telegraph pole and building sparkled and shone as if it had been treated with several coats of varnish. The extent of the city of Chicago may be judged from the fact that it took our train nearly an hour to reach Van Buren street after passing the city limits.

I found Mr. A. S. Hibbard overwhelmed with work in getting settled as the general manager of the Chicago Telephone Company. During and even previous to the World's Fair he will certainly have his hands full in preparing for and taking care of the immense traffic which the telephone system of this city will be subjected to during the next year or so. Mr. Hibbard smiled broadly when I mentioned the Harrison Inter-National Telephone Company with its $80,000,000 of capital, and said he thought of starting right back to New York when he heard of such a formidable rival. Mr. Hibbard's previous experience as general superintendent of the Long Distance Company makes him a most valuable man to govern the affairs of Chicago's large telephone system. I am sure that the longer Mr. Hibbard remains at the helm the better Chicago people will like him.

Mr. J. C. T. Baldwin, recently of the Metropolitan Telephone and Telegraph Company, is expected to arrive here within a day or two. He will also be connected with the Chicago Telephone Company as superintendent.

I learn that one of the Vanderbilt families will visit the World's Fair in regal comfort. A house in the swell residence district on the South Side, which was built by the late Gen. Anson Stager, at one time superintendent of the Western Union Telegraph Company, and president of the Chicago Telephone Company, has been leased from the present occupants by a Vanderbilt agent for six weeks during the World's Fair at a rental of $10,000. This agreement includes everything as it stands to-day in the house and stables. The present occupants will move out leaving the pins in the pin cushions, and the Vanderbilts will move in. How is this for luxurious sight seeing?

Mr. William Hood, the Chicago agent for the Electrical Manufacturing Company, of Oconto, Wis., tells me that his company is still manufacturing incandescent lamps, and that he is finding a ready sale for the product. I asked him how soon his factory would be closed up, and he replied that he didn't believe that even a temporary injunction could be secured against his company. He intimated that when the General Electric Company tackled the Oconto Company a great surprise party would be unearthed.

I learn that the Chicago Edison Company is to absorb the Chicago Arc Light and Power Company. Mr. Samuel Insull, formerly second vice-president of the Edison General Electric Company, is president of the Chicago Edison Company, and when I called upon him he confirmed the report, but stated that the negotiations were not yet completed, nor had the terms of exchange been finally decided upon. It was told to me in other quarters that the Arc Light and Power Company's stock would be exchanged either for stock or six per cent. bonds of the Edison Company, on a basis of 120 for the Arc Light and Power stock. The capital of the latter company is nearly $2,000,000, and that of the Chicago Edison Company is $1,500,000, so that when the combination is completed, Mr. Insull will have under his direction a company with about $3,500,000 of capital. The Edison Company is building two new stations, one on the North and one on the West Side, and ultimately the company will control six plants for supplying electric light and power.

Mr. Insull considers the combination a good thing for the Chicago Arc Light and Power Company stockholders, and equally advantageous for the Edison Company. He has just returned from Pittsburgh, where he was shown through the Westinghouse factories by Mr. George Westinghouse, Jr. Mr. Insull has not much faith in the new Westinghouse lamp, and does not believe it will come into commercial use to any great extent. This is natural, of course, when Mr. Insull's close connection with the Edison lamp interests is considered.

"I like Chicago and its people very much indeed," said Mr. Insull, "and as I have always liked the illuminating business, I am consequently very well satisfied." A number of the most influential business men of this city are directors in the Chicago Edison Company, which will hereafter control the great bulk of the electric lighting and power business of this great city.

A bill has been introduced into the Illinois legislature authorizing "cities and villages to construct and maintain gas and electrical works for municipal purposes and to supply private consumers." An organization styling itself the Municipal Gas League is behind this measure, and has a petition in its favor, which, it is claimed, is signed by 20,000 citizens of Chicago, and is the product of less than a week's labor. The Chicago *Evening Journal* is not in favor of this measure and thus expresses itself:

But where is this thing to end when once begun? What reason is there why the city should go into the business of lighting streets not only, but dwellings and public buildings, and not into the heating of these structures? Why should not the city furnish transportation over its territory as well as light? The reason why none of these things should be done by the city, is that they can be as well if not better done by individuals or by corporations. So long as municipal governments cannot keep the streets in proper condition—that which is especially their province—it is not worth while for them to extend the field of their inefficient work.

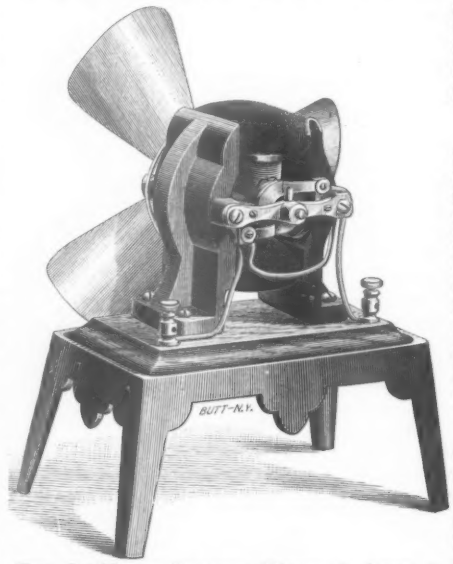
The American Telephone and Telegraph Company's long distance line between Chicago and New York is becoming more popular every day and it will be but a short time until the one existing line is working to its maximum capacity, necessitating the construction of additional lines. The Chicago end of this business is in charge of Mr. Stoughton Walker, district superintendent, who was graduated from the Massachusetts Institute of Technology in the class of '88 and who is a son of the president of the Institute, Gen. Francis A. Walker, the eminent political economist and superintendent of the census of 1880. Mr. Walker is an able telephonist and his courteous treatment of patrons has gained no little popularity for the long distance service.

It is rumored in Chicago electrical circles that the Siemens & Halske Electric Company, of America, have recently imported 200,000 incandescent lamps from Germany. These lamps were made under the Edison patents which the Siemens & Halske Company control in Germany. It is supposed that they are to be used in the new factories of the company in Chicago, as it is said that there would not be enough profit in importing the lamps were they intended to be put on sale. If the General Electric Company attacks the Siemens & Halske Electric Company of America in this matter, supposing the rumor to be true, a very pretty question will be raised. The lamps are certainly not an infringement as they are made under the Edison patents, and yet if they can be imported and sold in this country the monopoly which our highest court has granted to the General Electric Company is broken.

CLEVELAND, OHIO, FEB. 8.—It is said here that the converting of the Superior street cable road into a trolley road is among the probabilities.

None of the incandescent lamp manufacturing companies in Ohio have as yet been enjoined by the General Electric Company. A well-informed man has assigned as a reason for this that Ohio is the home of Senator Sherman and the anti-trust bill, and that in view of this the General Electric Company is saving the Ohio lamp men for the last.

The Buckeye Electric Company, of this city, manufacturers of the Buckeye incandescent lamp, are behind in their orders 75,000 lamps, and last week received orders for 42,000 lamps, while their weekly capacity is but 18,000, or 3,000 a day. Treasurer Rockwell says the Buckeye Company has decided upon no definite policy, but is quietly awaiting the pleasure of the General Electric Company, and in the meantime is making and selling lamps as quickly as possible. Mr. Rockwell hopes, of course, that the Goebel claims will be sustained, and says he understands from a reliable source that the General Electric Company will sue for no more injunctions against lamp manufacturers until the Goebel matter is finally settled. As I mentioned in the REVIEW about two months ago, the Buckeye Company has a new lamp in hand which is said to be very similar to the Westinghouse lamp, and it is possible that this lamp will be placed on the market if the General Company obtains an injunction against the Buckeye Company on account of the lamp now being manufactured by them.



THE DE MOTTE ELECTRIC MOTOR—J. JONES & SON, NEW YORK.

Mr. S. M. Hamill, of the Brush Electric Company, spent several days of this week in Chicago on business for his company.

The recent failure of the W. D. Graves Electrical and Manufacturing Company, of Cleveland, manufacturers of the Graves arc lamp, will, it is said, produce interesting developments in regard to the financial affairs of the company. Mr. Graves, the inventor of the lamp, managed the business of the company, and, it is alleged, turned in the cash receipts to Mr. F. J. Stafford, who acted as treasurer of the company and represented the largest stockholder. Mr. Graves, it is further alleged, took no receipts from Mr. Stafford for these moneys, and no one knows the amount of cash handled. Mr. Stafford is at present general manager of the Cleveland Electric Light Company. In the meantime the affairs of the W. D. Graves Electrical and Manufacturing Company are in the hands of an assignee.

BUFFALO, N. Y., Feb. 10.—The city of Buffalo will be well worth watching during the next few years. It is one of the most thriving and progressive cities in New York State, and has the benefit of many natural advantages. There are more miles of steam railway track within the corporate limits of Buffalo than can be found in any other city in the Union. For further particulars about this interesting place I refer my readers to the Decennial Number of the ELECTRICAL REVIEW, published in February, 1892. Buffalo is a great city now, but when it receives electric power from Niagara Falls it will be still greater as a manufacturing center.

I went up to Niagara Falls to-day in company with the usual throng of visitors which the New York Central and Michigan Central Railroads are daily carrying to see the ice bridge. You who have not seen this magnificent natural phenomenon will be well repaid for the time and trouble you may be put to in order to make the journey. It is one of the most beautiful, wonderful and impressive sights a man can look at, and how it does emphasize man's inferiority!

The Dewey electric heaters in the trolley cars at Niagara Falls would give much greater satisfaction to the patrons of the road if the conductors would keep the car doors shut. No electric heater was ever intended as a competitor of a bonfire or crematory.

The Buffalo Engineering Company has recently perfected arrangements by which they will become agents for the Babcock & Wilcox boilers, instead of handling the National water tube boilers, as heretofore. Mr. W. S. Hine, general sales agent for the J. T. Case Engine Company, of New Britain, Conn., has placed his company's Buffalo agency in the hands of the F. P. Little Electrical Supply and Construction Company.

A practical demonstration of the Carpenter electric cooking and heating devices is being given daily at the store of W. H. Glenny, Sons & Company, and many Buffalonians have become greatly interested in electric cooking.

Ex-president Charles R. Huntley, of the National Electric Light Association, may be expected to shed the effulgence of his presence upon the St. Louis convention.

STEPHEN L. COLES.

A New Miniature Motor.

The De Motte electric motor, illustrated on this page, is presented by Messrs. J. Jones & Son, of New York, as an ideal small motor—not a toy, but as a perfect working model of the improved electric motor. These motors are specially designed to run model machinery, mechanical toys, music boxes, etc., and for ventilating dining room, parlor and office. The largest size can operate dental outfits and sewing machines. The cost is small, and the machines are well made.

To Annul a Bell Patent.

Attorney-General Miller filed a complaint in the United States Circuit Court for the district of Massachusetts, at Boston, against the American Bell Telephone Company and Emile Berliner. It asks for an annuling of patent No. 463,569 for a combined telegraph and telephone, applied for by Berliner on June 4, 1877, and issued November 17, 1891, to the American Bell Telephone Company as Berliner's assignee.

The grounds upon which the application is made are that the claims set up in the Berliner patent, granted in 1891, are covered by previous patents issued to the Bell Company, and that the possession of said patent will continue to the Bell Company without substantial diminution during the full term thereof the same close monopoly of the art of telephony in the United States which it has enjoyed under patent No. 174,485.

ADVANCE INFORMATION.

New Electric Companies Formed and Important Constructions Projected.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week:

New Electric Railways.

CHELTENHAM, PA.—The Ashbourne and Cheltenham Electric Railway Company will build an electric line between these two Pennsylvania towns.

DULUTH, MINN.—The Duluth *Herald* states that a strong syndicate has been formed for the purpose of constructing another street railway in Duluth. The new company will apply to the common council for a franchise, and will offer to pay an annual revenue based on the business of the road. The trolley system will be used.

SAGINAW, MICH. — The Saginaw Street Railway Company, operating a horse car system, is endeavoring to secure a franchise to enable it to conduct a double track electric motor system.

HAZLETON, PA. — The Northumberland, Bloomsburg and Scranton Railway has been formed here with a capital stock of $500,000. The projected road is to be built from Northumberland to Scranton.

SPRINGFIELD, OHIO.—The first step in building the electric railroad from Springfield to Cincinnati has been taken, arrangements having been made to build one of the links from Harshmanville to Franklin. W. H. Mays and D. Dwyer, of Miamisburg, are behind the scheme and will organize a company at once.

NEW BEDFORD, MASS.—The selectmen of Westport have granted the Dartmouth and Westport Street Railway Company a franchise.

WASHINGTON, D. C.—The Columbia Street Railway Company has decided to abolish horses as motors upon its road, and has also decided to run its cars by electricity, the system adopted being the one so successfully operated in Buda-Pesth. The cost is less than that of the cable, but is much in excess of the expense of trolley construction.

FLORENCE, COLO.—A company has been formed with a capital of $100,000, for the purpose of building an electric motor line to connect Florence with the coal mining towns of Williamsburg and Coal Creek. Isaac Canfield, J. A. McCandless, J. M. Hanks and H. C. Topping, are the incorporators.

ROCKPORT, MASS.—George R. Bradford, Loring Grimes, H. N. Woods, Zeno A. Appleton, Nathaniel Richardson and others have asked to be incorporated as the Rockport Electric Street Railway Company, with capital not less than $25,000 or more than $50,000.

GOFFSTOWN, N. H.—A bill before the legislature incorporates the Uncanoonuc Electric Railway, to run from Manchester through Belford and Goffstown.

HAGERSTOWN, MD.—William C. Seddon & Company, A. H. Rutherford, J. L. Blackwell and D. Murdock, bankers of Baltimore, have submitted propositions to construct an electric street railway in Hagerstown.

BEVERLY, MASS.—The town has voted to grant the Lynn and Boston Railway Company the right to use the overhead system of electric traction.

PHILADELPHIA, PA.—The Forty-ninth Street and Westminster Avenue Passenger Railway Company; capital, $250,000.—The Thirty-second Street and West Park Passenger Railway Company; capital, $250,000.—The West Side Passenger Railway Company; capital, $250,000. The incorporators for all of these lines are John L. Fry, George H. Roberts, Howard C. Potts, George Hall, George F. Gibson, Jr., and Nicholas H. Hare.

PEEKSKILL, N. Y., On Saturday, February 4, the citizens voted on the question as to whether or not they were to have an electric railroad. There were 968 votes polled, of which 928 were in favor and 40 against the trolley. The franchise will no doubt be granted by the board of trustees at their next meeting.

PHILADELPHIA, PA.—The Belmont Avenue Railway Company; capital, $18,000. Incorporators, Geo. B. Roberts, D. E. Williams, John S. Gerhard and James A. Logan. The company proposes to build a trolley road to the suburbs.

HARPER'S FERRY, W. VA.—The Love Electric Traction Company; capital, $500. Incorporators. Chas. A. Ealeston, of Forest Glen, Md.; John Malone and Howard S. Nyman, Washington, D. C.; and A. J. Warner, of Marietta, O.

Electric Light and Power.

LINCOLN, NEB.—Councilman Meyers has introduced an ordinance granting a franchise to the Lincoln Electric Light, Heat and Power Company.

MARION, IND.—B. T. Delafield having been granted necessary permits by council, will at once commence the erection of a complete electric plant to be operated by water power. A 2,500 incandescent light dynamo, a 35 light arc machine and a 175 horse-power engine will be used.

OCEAN CITY, N. J.—The Ocean City Light, Heat and Power Company has been organized by C. A. Campbell, Ezra Lake and others.

MANASQUAN, N. J.—The Manasquan Electric Light and Power Company has been incorporated by George Lane and others. Capital, $25,000.

FRANKLINVILLE, N. Y.—A company has been organized at Delevan, known as the Delevan Electric Light Company. It asks permission of the village authorities to construct a line.

WICHITA FALLS, TEXAS.—A franchise to put in an electric light system has been granted to F. B. Morrison.

PLATTEVILLE, WIS.—The capital stock of the electric light company has been doubled to pay for contemplated improvements.

NELSONVILLE, OHIO.—It is proposed to establish an immense electric plant to furnish light and power for all the mines within a radius of eleven miles of Nelsonville.

KANSAS CITY, MO.—Missouri Water and Light Company, of Kansas City; increase of capital from $2,000 to $75,000.

DENVER, COLO.—The Colorado Electric and Gas Company; capital, $500,000. The articles cover the whole field of producing, illuminating and power by both gas and electricity.

New Manufacturing Companies.

EAST ORANGE, N. J.—The Enamel Electric Manufacturing Company; capital, $10,000, of which $1,000 is paid in. Incorporators, Edwin A. Jeffrey and W. H. Fancher, of Jersey City, and Thomas Erving, Jr., of Yonkers. The company will manufacture all kinds of electrical machinery and apparatus.

NEW YORK, N. Y.—The New York Electrical Works; capital, $50,000. Directors, Frederick K. Fitch, of New York city, and Miller A. Smith and Howell Smith, of Brooklyn.

ST. LOUIS, MO.—The Telephone and Telegraph Service Company; capital, $25,000. Incorporators, T. T. Lewis, J. M. Sellers and A. V. L. Brokaw.

Special Train from New York for Electric Light Association Delegates.

TO THE EDITOR OF ELECTRICAL REVIEW:

An excursion rate of a fare and a third has been granted to St. Louis and return, for delegates attending the convention of this association, by all the passenger associations, except the Western; negotiations are now pending with them and in all probability they also will grant this concession.

Arrangements have been perfected for a special train to carry the eastern delegation, which will be vestibuled, electrically lighted, and composed of dining, buffet, observation and sleeping cars, and will leave New York, *via* Pennsylvania Railroad, from stations foot of Cortlandt and Desbrosses streets, Sunday, February 26, *at* 12 *o'clock noon;* Philadelphia, 2.25 P. M.; Harrisburg, 4.25 P. M.; Pittsburgh, 10.40 P. M. (Central time); Columbus, 4.35 A. M.; Indianapolis, 10.30 A. M.; arriving at St. Louis, at 5.30 P. M., Monday, February 27.

The rate for berths is $6 each; drawing-rooms, $22 each.

For the convenience of passengers taking this train from New York, arrangements have been made so that if they will remit to

WHAT THE HUDSON RIVER MAY COME TO.
—*Once a Week.*

the undersigned the amount of railroad fare ($24.25), with the sleeping-car fare ($6), a receipt will be mailed them that will be honored by the railroad company for checking baggage, ferry passage, and passage through the gate at Jersey City, and exchangeable on the train for regular railroad ticket and certificate.

The Boston passenger committee have declined to sell tickets at a reduced rate from Boston *via* New York; therefore, the eastern delegates who desire to take the Electrical Special will be compelled to come to New York, purchase tickets and secure certificates from New York to St. Louis and return.

It is quite important that all the names of delegates who will be passengers on the Electrical Special shall be known as soon as possible.

The following named gentlemen have charge of transportation matters for their various territories: Morris W. Mead, Pittsburgh, Pa.; Fred. W. Royce, Washington, D. C.; H. A. Cleverly, Philadelphia, Pa.; A. C. Shaw, Boston, Mass.; John Carroll, Montreal, Can.; M. J. Hart, New Orleans, La.; John W. Flintham, Denver, Colo.; J. Scribner, 173 Adams street, Chicago; Louis Nahm, St. Louis, Mo.

To secure the benefit of the reduced fare returning, it will be necessary for those who do not go by the Electrical Special to be sure and state to the ticket agent from whom they purchase the going ticket that they purpose attending the meeting of the association at St. Louis, and procure from him a certificate which will entitle them, when properly viséd and countersigned, to return for one-third the regular fare. No reduction can be obtained without this certificate. Immediately upon arriving in St. Louis, these certificates should be left in the secretary's office, addressed to the undersigned, who will see that they receive proper attention and are returned to the owners.

C. O. BAKER, JR.,
Master of Transportation.
136 Liberty street, New York, Feb. 9.

The Supreme Court of Pennsylvania, in a decision rendered by Justice McCollum, holds that the new conditions of rapid street transit impose new requirements on foot-passengers, a disregard of which constitutes negligence and bars the way to recovery for damages to persons or property. The same principles of law that held good as to the slow-moving horse cars will not apply to electric and cable cars in case of accident.

Change of Name of a Widely Known Electrical House.

Hereafter the organization that has conducted a large business under the name of the Electrical Supply Company will be known as the Ansonia Electric Company. While this company was the first to assume the name incorporating the words "Electrical Supply," and while by all rules of precedence it should be entitled to the undivided use of the words as applied to a company name, it seems that the very nature of the business, and the expensive methods that have been employed to make the name known, has served also to establish in the mind of the general public an understanding that it was rather a descriptive name, applying to a large class of similar enterprises, rather than to one specific organization. So that many times the question might be asked, in determining the source of certain supplies, "Which Electrical Supply Company?" Thus, one of the chief reasons for changing the name has been to avoid the use of those two words which have become a misnomer. And then another reason: During the past few years many concerns have been started all over the country calling themselves this or that electrical supply company.

Statistics show that of the numerous electrical supply firms started during the past 10 years, more than 90 per cent. have failed or otherwise gone out of business. These various little concerns, in many known instances, fostered the belief in their locality that they were related in some way to the large manufacturing company of the same name, and when these little fellows folded their tents, and the sheriff came and took possession, it left a bad impression, and while it, perhaps, did no particular damage to, yet it reflected no particular glory upon, the original company, that did not even know of their existence. Various circumstances of this kind might be quoted as reasons why the managers of the Electrical Supply Company finally determined that, perhaps, it would be best to make a change in the name. Nothing else but a change of name was contemplated, and no other changes have been made whatever, either in the organization or the *personnel* of the company.

In the minds of the pioneer electrical men Ansonia, Conn., will always hold a warm place, for many of the men who are prominent in the development of the science have made pilgrimages to Ansonia in the quest of information, or to confer with the man, Mr. William Wallace, to whom can be traced the first practical ideas of the commercial advantages of electric lighting. In Ansonia the first dynamo in this country was built; it was in Ansonia that the electric light was first used commercially.

It might also be of interest to note that at Ansonia the first electric light carbons were made, but at that time they were made in the form of thin slabs, or square sticks, instead of the round carbon with which we are familiar to-day. It was Mr. Wallace, also, who conceived the idea of giving the carbons a coating of copper to increase the conductivity.

The name of the Ansonia Electric Company is, therefore, one that will, in every way, very properly represent and fit the company that had its start in Ansonia, and was established by the man and his sons who have been so thoroughly and clearly the pioneers in the business.

ELECTRIC RAILWAY AND POWER NOTES.

The Altoona and Logan Valley Electric Railway, of Altoona, Pa., has let contracts for the complete equipment of its line.

A project will soon be started to connect Beaver Falls, Castorland, Croghan, Lowville and Carthage, N. Y., by an electric railway.

Owing to the sleet on the wires and tracks on many trolley lines in the Eastern States, traffic has been considerably delayed during the past week.

The people of Peekskill, N. Y., will vote this week whether an electric railroad shall be operated in the village or not. Most of the people favor it.

The right of way is being obtained for an electric car line from Harshmanville through Dayton, Ohio, a total length of four miles with a view to its extension to Miamisburg, eight miles further.

Manager R. Semmes, of the Mobile, Ala., street railway has notified the mayor and general council that he is now engaged in rebuilding the street railway lines and preparing them for electricity.

KINDRED INTERESTS

J. W. Parker & Company, Philadelphia, Pa., representatives of the Ball Engine Company, Erie, Pa., are installing an 80 horse-power Ball engine at Malden, West Va., for experimental mining haulage.

J. Jones & Son, 39 Vesey Street, New York, have just issued a catalogue of electrical supplies and specialties. Among the goods sold by this company are the Varley electric time call and De Motte electric motors.

The Detroit Electrical Works was recently awarded the contract of the Detroit Citizens Street Railway Company, of Detroit, Mich., after close competition. The order calls for 36 complete motor equipments additional.

Mr. W. R. Mason, the general manager of the Railway Equipment Company, Chicago, has just sent out a circular to the eastern trade, calling attention to the unexcelled facilities of the company for furnishing everything necessary for the complete equipment and maintenance of electric roads, and also calling particular attention to the merits of the type "G" overhead material manufactured by his company. This material has been specified on a majority of the leading roads during the last season. He also informs the trade that he expects to be in New York the latter part of this month, and will call on the leading contractors and street roads in the East.

The National Pipe Bending Company, of New Haven, Conn., have recently installed their apparatus in the following electric plants:

100	h. p.	Little Falls, N.Y.	80	h. p.	New York.
50	"	Leesburg, Va.	150	"	Dickerson Run, Penn.
100	"	New York.			
80	"	Stamford, N. Y.	300	"	Bristol, Conn.
100	"	Punxsutawney, Penn.	600	"	Pittsburgh, Pa.
			50	"	Bridgeport, Conn
80	"	Fort Edward, NY	100	"	Rochester, N. Y.
800	"	Portland, Me.	100	"	Lee, Mass.
500	"	Jersey City, N.J.	150	"	Lexington, Mass.
400	"	Yonkers, N. Y.	150	"	Montgomery, Ala
50	"	El Dorado, Kan.	600	"	New York.
400	"	Altoona, Penn.	500	"	Brooklyn, N. Y.
600	"	Mott Haven, NY	400	"	Keokuk, Ia.
400	"	Lawrence, Mass.	1000	"	Hazelton, Pa.
150	"	Mott Haven, N Y.	50	"	Sioux City, Ia.
40	"	Sandusky, O.	1350	"	Boston, Mass.
150	"	Macon, Ga.	300	"	Montello, Mass.
300	"	Hoboken, N. J.	60	"	Princeton, Ill.
400	"	Rondout, N. Y.	125	"	Petersburg, Va.
50	"	Derry, Penn.	125	"	Montello, Mass.
100	"	Rondout, N. Y.	400	"	Hoboken, N. J.
600	"	Binghamton, N Y	300	"	Baton Rouge, La.
400	"	Geneva, N. Y.	500	"	New York.
500	"	Haverhill, Mass.			

Among a Number of Sales recently made by the Chicago office of the Ball Engine Company, Erie, Pa., are the following: Calumet Electric Street Railway Company, Chicago, 4,300 horse-power Cross compound electric railway engines; Hammond Electric Street Railway Company, Hammond, Ind., one 150 horse-power steam plant, complete; H. D. Bentley, Freeport, Ill., one 35 horse-power steam plant, complete; Elmwood Electric Light Company, Elmwood, Ill., one 150 horse-power engine; Union Passenger Station, Chicago, one 125 horse power engine; Keith Bros. & Company, Chicago, one 50 horse-power engine; Marengo Electric Light Company, Marengo, Ia., one 100 horse-power steam plant, complete; Scott & Royce, Griggsville, Ill., one 50 horse-power steam plant, complete; Western Light and Power Company, Chicago, one 300 horse-power engine; Englewood Electric Light Company, Chicago, one 500 horse-power Cross compound engine.

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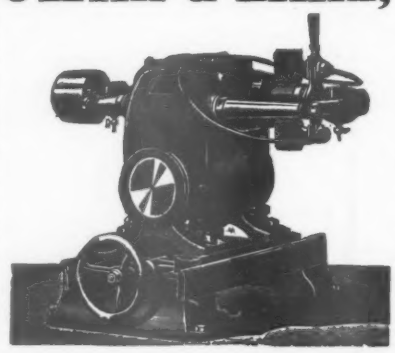

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